

ABSTRACT
COMMUNICATION IN ORGANIZATIONS
[TECHNOLOGY AND COMMUNICATION BEHAVIOR IN AN ORGANIZATION:
A CASE STUDY IN INDIA]

By

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Technology in an organization is considered here as the defining characteristics of the organization. In the long run perhaps the perspective holds that technology be considered one of the available and more useful bases for comparing organizations, like several others which exist now, which view organizations as, decision making system, control system, or cooperative systems.

An examination of literature on organizational communication shows there is a general consensus that communication is a central phenomena in organizations. Still there is little explicit discussion or empirical research on the structure and process of communication, in relation to other organizational characteristics. Technology level is one of such variables which is least explored. There are no significant studies available which relate technology to communication behavior in the organization.

Technology is the "actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make some change in that object. The object, or 'raw material' may be a living being, human or otherwise, a symbol or an inanimate object" (Perrow, 1967, p. 195). In the course of changing these materials

within an organization, the individual must interact with others. Such interactions are referred to as communication, which is defined as the transmission of an idea from the source to the receiver with the intention of influencing his behavior.

The basic premise of the present dissertation is that organization, as a system for getting the work done, for applying techniques to the problem of altering raw materials--people, symbols, or things, influence the basic work tool--communication.

Secondly, that an organization employs technologies which are simple and complex, less mechanized and highly mechanized, depending on the task that has to be done. Within an organization some units are technologically more homogeneous than others. The homogeneity or heterogeneity of technology will influence communication behavior. More alike groups, probably will show more similar communication behaviors.

Thirdly, within top, middle, and lower echelons of management communication behaviors will be more similar within each level than between levels.

The organization studied is called the ARC organization, which is located in North India. The organization deals in heavy steels, and with no commercial production but only takes orders. It has four main departments: production, commercial, administration, and finance.

The present study proposes a continuum of technological complexity from simple to very complex and places the two groups of departments studied, along this continuum of technological complexity. The production department shows a higher degree of mechanization compared to

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a group of three departments, employing lower mechanization. But the two groups are quite similar on other characteristics of the technological complexity continuum.

The communication behavior is studied in terms of the mode--written and oral, amount--frequency and duration, initiation--seeking and receiving, direction--vertical or formal and horizontal or informal, and finally, function--production and innovation, that messages have, in the organization.

This is a comparative study. The comparison is made among two groups of departments, distinguished on the basis of the levels of mechanization that they employ. Secondly, comparison is made between three levels of management hierarchy.

The data were collected by observations, depth interviews, and a 20 items questionnaire, on 250 employees of the ARC organization during a period of six weeks in 1971. The study involved only one organization, hence the results may have limited generalizability.

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TABLE OF CONTENTS

Chapter		Page
I.	INTRODUCTION TO THE PROBLEM	1
	Purpose	1
	Justification of the Study	1
	Definitions of the Terms Used	7
	An Overview	9
II.	COMMUNICATION AND ORGANIZATIONS	11
	A General Overview	11
	Communication Process and System	11
	Communication Models	12
	Communication and Meaning	17
	COMMUNICATION AND MANAGERIAL CONTROL	20
	INFORMATION SYSTEMS OF MANAGEMENT	22
	Summary	24
	SYSTEMS' VIEW OF ORGANIZATIONS	26
	Communication Subsystems of Organizations	31
	Nature of Management Communication	34
III.	A CRITICAL REVIEW OF STUDIES ON COMMUNICATION RELEVANT TO ORGANIZATIONAL COMMUNICATION	39
	Purpose	39
	Psychological studies	40
	Sociological studies	43
	Network studies	46
	Grapevine or rumor studies	50
	Functional-operational studies	55
	Organization and management studies	58
	Summary	68

Chapter		Page
IV.	TECHNOLOGY AND COMMUNICATION IN ORGANIZATION . . .	72
	Technology Defined	72
	Importance of Technology	75
	Relevant Studies Implying Relationships Between Technology and Communication	76
	Technology and Structure	77
	Technology and Individuals	80
	Technology and Social Relations in Organizations	82
	Communication and Technology	87
	SUMMARY	89
V.	ANALYSIS OF THE ARC ORGANIZATION: A CASE STUDY . . .	90
	Introduction to the Organization	90
	Structure (As Explained by the Chart).	92
	Structure As Actually Observed	98
	The Context of the Present Study	104
	Analysis of the Technical Variable	108
	Mode of Communication	115
	Amount of Communication	117
	Initiation of Communication	117
	Function of Communication	121
	Direction of Communication	122
	The Sample Characteristics	128
	Design of the Survey	137
	Data Collection	139
	Questionnaire	140
	INTERVIEW	153
VI.	FINDINGS	159
	Interview Results	159
	Questionnaire Findings	165

Chapter		Page
VII.	SUMMARY, CONCLUSIONS, AND SUGGESTIONS FOR FURTHER RESEARCH	194
	Summary	194
	Conclusions	196
	Further Research Suggestions	198
	BIBLIOGRAPHY	203

CHAPTER I

INTRODUCTION TO THE PROBLEM

Purpose

This thesis reports the results of a study done in India on communication behavior in an organization and how it is influenced by the nature of the technology employed in the organization. The purpose of this study is to determine the communication behavior of members at various hierarchical positions, in relation to the nature of the work that they perform.

Justification of the Study

Examination of the literature on formal organizations reveals little explicit discussion or empirical research on the structure and process of communication. There is, however, general consensus that communication is a central phenomena in organizations. Fayol and Urwick were some of the early theorists to posit communication as a central concern in organization theory. Communication serves several important functions in an organization: (1) it seems to provide a common knowledge about the goals, (2) it serves essentially as the vehicle by which an organization is embedded in its environment, and (3) communication mediates the inputs and outputs of an organization. As Barnard stated: "In any exhaustive theory of organization, communication would occupy a central place, because the structure, extensiveness, and scope of

organizations are almost entirely determined by communication technique" (1938).

From management's perspective, an organization is an elaborate set of interconnected communication channels designed to collect and collate, analyze, and sort out information; also as a system for making decisions, acting them out, getting feedback, and correcting itself.*

More recently Katz and Kahn (1966) defined organizations from a systems' viewpoint, characterizing an organization as both an energetic and information system with the function of the information system being management of the energetic system. Within this conceptual background, they emphasize the importance of communication. The closer one gets to the organization center of control and decision-making, the more pronounced is the emphasis on information exchange. In this sense, communication is the exchange of information and the transmission of meaning which is the very essence of a social system or of an organization. The input of physical energy is dependent upon information about it, and the input of human energy is made possible through communicative acts. Katz and Kahn (1966, pp. 223-224) admit that "communication is thus a social process of the broadest relevance in the functioning of any group, organization, or society. It is possible to subsume under it such forms of social interaction as the exertion of influence, cooperation, social contagion or imitation, and leadership."

*Viewing organizations from the standpoint of management theory, Dorsey (1957), Koontz and O'Donnell (1968), and McFarland (1970), explicitly identify administration as a communication process.

It is evident from a review of literature that communication is assumed to be a central process in an organizational context. But very little has been done in terms (1) of theory building in the area of organizational communication, or (2) of empirical research within the context of this communication theory of formal organizations. As Thayer points out (1967, pp. 80-81):

Perhaps more has been 'communicated' about 'communications' 'problems' in organization than any other single topic in the field. Yet this plethora of commentary has not been conducive either to theory building or theory-validation. This bulk, most of which represents individual curiosities rather than scientific endeavor, defies cataloging on two points: First, the studies themselves have not been carried out in the context of any superordinate theory and hence offer little possibility for conceptual systematization; second, most have been based upon normative and not empirical assumptions. Consequently, their conceptual usefulness is severely diminished . . . no single integrated body of literature has been accumulated.

It has become very important to study communication in the context of ongoing organizations. The justification for the present study arises from the commonplace acceptance of the necessity of effective communication for effective management. Management depends on communication. People who manage are communicating all the time when they plan, organize, command, control, and evaluate the operations of the firm. Communication occupies a very important priority in a manager's kit of tools or skills. The importance of communication is heightened when one investigates certain organizations, some of which have good and some poor systems of communication, and finds that those with good systems have fewer disputes, lower labor turnover, and lower absenteeism than those with bad or ineffective communication systems. Thus organizational communication has important effects on employee

behavior, as well.

We justify our study on the grounds of inadequacy of the available research in the area of technology and organizationally structured variables. There are studies (Woodward, 1958, 1965, 1970; Burns and Stalker, 1961; Litwak, 1961; Blauner, 1964; Perrow, 1967, 1970; Aiken and Hage, 1967, 1968, 1969, 1971; Hickson, Hiaings, Pugh, and Pheysey, 1967, 1968, 1970, 1971; Harvey, 1968)* available, which deal with some aspect of organizational behavior related to technology. But there are almost no studies which have dealt with communication behavior in relation to technological aspects of the organization. The two noticeable exceptions are the studies of (1) Hage, Aiken, and

*Various authors have associated technology with several organizational structural variables. Woodward associated technology with authority structure, size, formalization, and control; Burns and Stalker found technology to be the determinant of organizational hierarchical system, flexibility-rigidity of the system; Blauner used a similar definition, to Woodward, of technology as in production process, and studied individuals' involvement or alienation in the organization; Perrow studied the routineness and nonroutineness of technology and builds a model which takes account of such variables as size, authority structure, type of service provided, decision-making, and degree of bureaucratization; Aiken and Hage studied routineness of the technology of the entire organization (not just of any particular technique) and related it to the degree of centralization, formalization, and staff type, etc; Hickson et al., think that there are three facets of technology--operations, materials, and knowledge, together called work flow integration, and they relate this technology to size, ownership, authority, etc.; Harvey thought of technology in terms of its specificity and diffuseness and related it to division of work (specialization), levels of authority, programs of plans, and staff size.

Marrett (1971),* and (2) by Harvey (1968).** Both of these studies mention communication and how it may be related to the technological structure of an organization.

So there is an acute necessity to study the technology and communication aspect of organization structure.

Furthermore, the present study is done in an Indian setting. There are not many studies about business communication in India. There are some theoretical expositions of this topic, but very few empirical studies.*** Hence the entire area is relatively unexplored. It becomes more important to study this topic in India than in England or the United States, where there are many studies available.

The lack of previous organizational communication studies in India is one reason why the present study is an exploratory study,

*Hage, Aiken, and Marrett, in their study of coordination (within an organization) as it relates to volume and direction of communication, suspect that the relationship of these variables is influenced by the nature of the technology in the organization or by characteristics of the environment. They expect that the non-routine technology may lead to more specialization, differentiation in structure, and hence a greater need for coordination and feedback resulting in a greater volume of communication. This is also expected by Perrow (1965), Thompson (1967), Lawrence and Lorsch (1967a).

**Harvey mentions that Burns and Stalker thought that the organic system is characterized by less formality in jobs, greater emphasis on adaptability, and communication along the hierarchy tending more to take the form of consultation than of command. While the mechanistic system, because of its specialization characteristics, has the polar opposite of the organic system.

***Writings by management scholars like Agarwala and Dasgupta, a few studies done by the psychologist Ganguly, and social scientists at the Shri Ram Center at Delhi, were the only available literature on the theoretical or research nature on this topic encountered by the present author.

rather than a hypothesis-testing study. Immediately, it is important to obtain a general picture of the communication environment in organizations so that specific inquiries of interest can be based on these results.

The present study features an investigation of the communication behavior in a manufacturing organization. This organization is a public-sector concern.*

We study communication behavior in terms of its (1) mode--written or oral; (2) amount--in terms of duration and frequency of communication; (3) function--in terms of production and innovation at work; (4) initiation--in terms of who seeks communication and who receives communication; and (5) direction--whether communication is formal (vertical), or it is informal (horizontal). Also, we studied the communication behavior of individuals at various ranks which were labeled as top, middle, and lower echelons of management. So the present investigation is a comparative study of the communication behavior of various managerial levels.

The communication behavior of individuals at various levels is related with the type of work they were doing in the four divisions--commercial, production, administration, and finance. These four divisions employ various technology to get the work done.

Since we studied only one organization, we contend that the present study is restricted in its generalizability. It is a rather

*In India it is often said that public-sector organizations represent bureaucracy at its fullest, as compared to private-sector business organizations.

particular description and analysis of the organization in question. Hence, the results are limited to the particular organizational setting in which the study was done.

Definitions of the Terms Used

One of the problems faced by many readers is to have a clear grasp of the meaning of a particular term used in the text. It is necessary for the reader and the writer to understand each other, and have a common meaning for a particular term. In order to facilitate such shared meaning, the following definitions are provided.

1. Respondents: Any member of the ARC organization, who was chosen to participate in the study.
2. Communication: The transmission of an idea from a source to a receiver with the intention of influencing his behavior.
3. Organization: A system of individuals who are brought together to achieve, through a hierarchy of ranks and division of labor, a common pre-determined goal or purpose.
4. Bureaucracy: Is a form of administration, followed by organizations of various sizes, characterized by adherence to rules and laws, division and assignment of work, impersonal governing procedures, and a centralization of structure.
5. System: Refers to a set of components, the relationship among them and the function served or the process that occurs within it.
6. Open-System: A complex, dynamic and adaptive system which is constantly interacting with its environment. The open system and its environment co-determine each other.
7. Sub-system: Is a constituting part of a larger system. Communication, authority, power, influence production are various subsystems, which aggregated make an organization which is a system.

8. Information: Is what gets communicated. It is units of patterned matter-energy that convey a meaning to a receiver.
9. Network: Communication tendencies or regularized behavior, which take various forms or shape, indicating the flow and to some extent the contents of messages exchanged.
10. Channels: The means by which a message is transmitted from a source to a receiver. They are either interpersonal (i.e., people have face-to-face contact) or mass (i.e., from one to many as via radio, T.V., etc.).
11. Models: An attempt to put the real world in terms of diagram and theory, in the hope of explaining some concept or some relationship among certain ideas or objects.
12. Variables: Are those factors which vary in situations, time perspectives, application, and among groups of people. In the empirical studies two types of variables are mainly studied: (1) the dependent variable, the main variable studied, and (2) the independent variable, the variable which determines the nature of the dependent variable.
13. Technology: Those "actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make changes in that object. The object, or 'raw material,' may be a living being, human or otherwise, a symbol or an inanimate object."
14. Innovation: Any idea or object which is perceived as new in the system, introduced with the hope of increasing efficiency and improvement in the present way of getting the job done.
15. Mode: The method, or way of doing something. Here it refers to two methods of communication--written and oral.
16. Amount: Means quantity of a particular object or variable. Here quantity refers to how frequent communication contacts are and how long they last.

17. Initiation: Refers to a tendency to begin some act. Here is used to denote the source of information. In other words, the person who makes somebody a receiver of communication. Also, it can be understood in terms of seeking. A person may seek information in addition to being a receiver.
18. Functions: The purpose or motive that certain messages perform, such as completion of job. There may be messages which encourage new ideas, and new ways of doing the work.
19. Direction: Refers to vertical and horizontal dimensions which messages take: Communication may flow top to bottom ($\downarrow \uparrow$) or it may flow between equals ($\rightarrow \leftarrow$).
20. Structure: Indicates the relationship among elements in a social unit. The elements may be individuals, or positions. Prestige, role, power, attraction, and influence are common behavioral patterns of individuals occupying position, with which they relate to other occupants. Structure can be understood in terms of its dimensions, like the degree of formalization, centralization, delegation of authority, etc.

An Overview

In this first chapter we have introduced the problem, and justified why this study is important. In the second chapter we establish a general framework by reviewing what communication is, and what organizations are, and how the two are similar in certain ways. In Chapter III we review the literature relating to organizational communication. Chapter IV specifies the problem of investigation: Relating technology to communication and organizational variables. In Chapter V we describe the organization (ARC) studied, the variables investigated, how the questionnaire and interviews were completed, the method of data-tabulation, and measurement. In Chapter VI we present the research findings

of the study. Finally, in Chapter VII we summarize the present inquiry, and suggest some future directions for research on technology and organizational structure.

CHAPTER II

COMMUNICATION AND ORGANIZATIONS

A General Overview

The purpose of this chapter is to establish a general frame of reference for the study of communication behavior and techniques of work performance. Communication pervades all management activities. Techniques are the ways or designs of getting a task accomplished, which utilizes communication as a basic tool. Both communication and organizations have features that need to be understood and comprehended clearly. This means a discussion of some of the basic features of both communication and organizations. In addition to this, we thought it crucial also to discuss some special features of both, which are germane to the study in question: For example, communication and control in management, usage of communication for management function, etc.

Communication Process and System

Communication means a transmission of ideas from a source to a receiver, with the intention of changing his behavior. This reflects a process point of view. Process is dynamic and on going. In general, in models of communication, concern has been with "who says, what to, whom, with what effect"; as well as "the source creates messages, and determines destination, etc."

This is not process.* Process implies system. This point becomes clearer if one understands what system means. Let us take a simple example: The hi-fi system. Why is it called a system? Because one is able to specify what is part of it, and what is external to it. Hence, the delineation of a set of units, and some specification of the boundary of the set, is a minimum requirement for the term "system."

The term "system" can be used to refer to a set of components, the structural relationships among those components, and the functions or process which occur. Components of a system are interdependent. They are linked through reciprocal loops, one of which is referred to as a "feedback loop." Communication involves a transmission of information from a source to a receiver. Communication components (source, messages, channel, and receiver) are interdependent. Their interdependence is produced through the complex interrelationships of the components. The components have both a structure and functions. Their characteristics and the relationships among those characteristics can be described, as can the process of communication. Hence, communication cannot occur external to some concept of system.

Communication Models

There are various communication models which attempt to explain what communication is. The term model here refers to an attempt to put the real world in terms of diagram(s) and a theory, in the hope of

*Even though the notion of process is implied in any definition of communication, most models of the communication concept imply otherwise by specifying the essential components of the communication process, as we see in the following section.

explaining some concept or some relationship among certain ideas or objects. One of the earliest communication models was that of Aristotle. He outlined three ingredients of communication: The speaker, the speech, and the audience. He mentioned that each of these three are essential to communication.

Little progress was made in constructing communication models for many years. Two models of the late 1940's and the early 1950's were propounded by Lasswell (1948) and Shannon and Weaver (1949). These models influenced the development of contemporary thought about the nature of communication.

Lasswell (1948) pointed out that a study of communication necessarily involves the following five questions: (1) Who?, (2) says what?, (3) in which channel?, (4) to whom?, and (5) with what effect?.

The older view saw the intent of communication being solely that of persuasion. In the persuasion process "who" was the speaker, "what," and "what channel" was the speech, and "whom" was the listener.

Figure 2-1 on the next page shows that communication was thought by Shannon and Weaver in terms of only an information-processing model. Shannon, a mathematician, and Weaver, an electrical engineer, developed a model to be used to measure the correspondence of speech patterns, when they were at various points in an electronic transmission system (i.e., the telephone system). The model did not make any reference to the contents of information but only to the fidelity of the information. Shannon and Weaver's model pointed out five ingredients in the communication process; (1) source, (2) transmitter, (3) signal, (4) receiver, and (5) a destination.

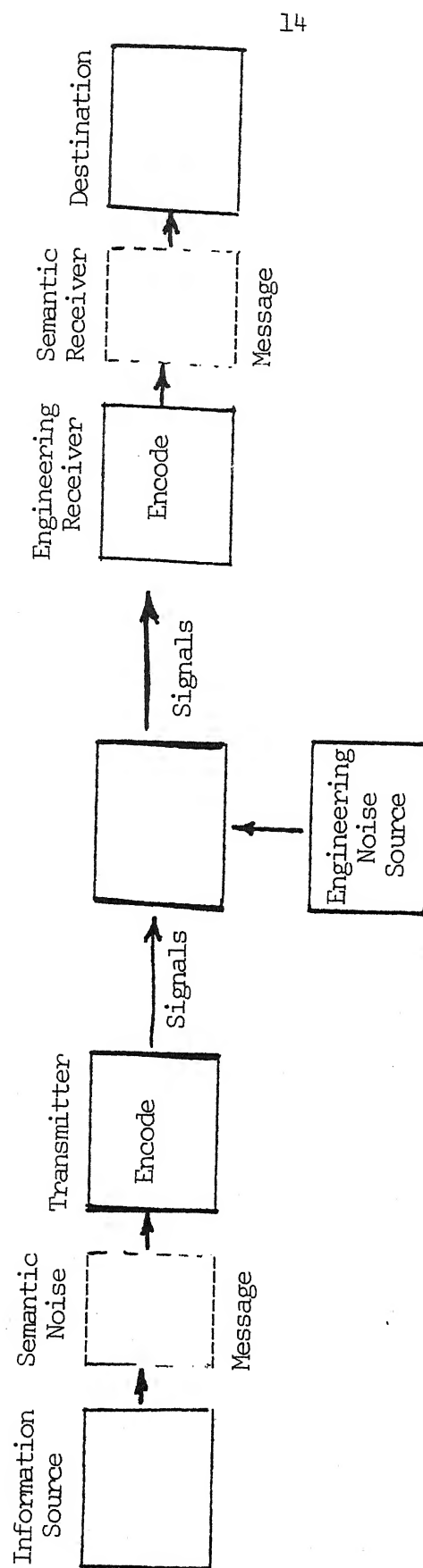


Figure 2-1. Shannon and Weaver's Communication Model
Adapted from Shannon's Schematic Diagram of a General Communication System.

In the 1950's, one of the beginning efforts was that of Berlo (1958), who proposed the SMCR model. He describes a source, with certain characteristics, which sends a message through a channel to the receiver. Later, a fifth element, effect was added to the model. Inclusion of the fifth element implied the much talked-about mechanism of feedback in the model of communication.

For communication to take place, it is essential to have a source, a message, and a receiver.* Communication is creating "commonness" by transmitting an idea from a source to a receiver. Schramm (1955) mentions that the communication act is an establishment of contact by a sender with the help of a message to a receiver. Figure 2-2a shows his point of view. The source, in his attempt to build commonness with his intended receiver, first encodes his message. This act consists of encoding the information in a transmittable form. The source can code into spoken words or into written words. The concerns of every source are: Will it reach the right person? Will he understand it as it was intended? Will he respond to it as desired? The sender wonders whether his message will be decoded and interpreted without distortion. In essence, if the sender and receiver are not on the same "wave length," the purpose of the sender will be defeated.

*Communication always requires at least three elements: The source, the message, and the destination. A source may be an individual or a communication organization (such as a television station). The message may be in the form of ink on paper, sound waves in the air, or any other signal capable of being interpreted meaningfully. The destination may be an individual, who is listening, watching, or reading; or a member of a group; or a mass audience, such as the reader of a newspaper, or a viewer of television.



Figure 2-2(a). Schramm's Model of Communication
 Adapted from Schramm (1955) in Richardson's
 Dimensions of Communication (1965).

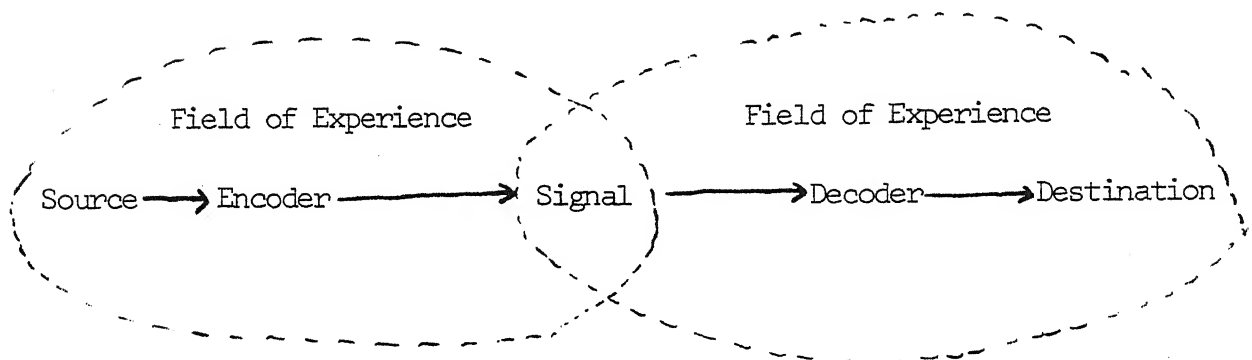


Figure 2-2(b). Schramm's Model of Communication
 Adapted from Schramm (1955) in Richardson's
 Dimensions of Communication (1965).

Figure 2-2b shows that the source can encode, and the receiver can decode, only in terms of a common experience that they have had. When the two circles do not meet, it is very difficult for any communication to take place in the absence of this commonness in experience. When the area of commonness is very small, the intended decoding of messages may not take place, or at least only to a small degree.

One of the most sophisticated models of communication is that of Westley and MacLean (1957). They emphasized the importance of feedback, place communication in the frame of an external environment, make clear that communication is an alternative to direct experience, and distinguish various communicator roles, implying the continuity of process.

The above discussion of models of communication presents a systems' point of view. Models delineate the components of the process which are: (1) Source, (2) message, (3) destination. Finally, communication is the transmission of ideas from a source to a receiver. The source attempts to establish a common referent about a particular idea or notion through a message. This leads us to the next section, on communication and meanings.

Communication and Meaning

The exchange of information is likely to be facilitated when a source and a receiver have some commonness of experience.* The idea which is transmitted, has some "meaning" for the sender and for the receiver. The closeness of meanings depends upon the shared experiences

*No two individuals have precisely the same life experience. Even granting that they have at their disposal the same equipment of semantic expression (sounds, words, grammatical, and syntactical forms). These means of expression will fail to coincide at approximately the same degree that the two individuals' experiences differ. A word or sentence is not entirely a bundle of sounds; it is also a bundle of association. These associational meanings are not quite identical for any two speakers: Meanings are relative. It can be assumed that no two people ever have exactly the same experience; therefore, no two people ever have exactly the same meanings. Furthermore, each individual constantly is experiencing; therefore, no one person can ever have exactly the same meaning for one symbol at two different points in time.

that the two have had. For example, "control" to an accountant means something quite different than what "control" means to a school teacher. Meanings are references (ideas, images, and thoughts) having a reference (concept or object), whether abstract or concrete, which are expressed in symbols (signs, signals, and codes).

Meanings involve symbol, reference, and referent. The relationship between these three explains the statement: "Meanings are in people, not in the message" (Berlo, 1950).^{*} All codes, whether of language or any other type of signal, are the symbols of some kind of reality, whether concrete or abstract. An idea, in order to convey meaning through symbols, should first have a clear relationship with its referent. A communicator's ability to choose among appropriate and adequate symbols determines to what extent ideas will take a meaningful form (the message). The relationship between symbols, references, and the referent in a communication situation, where meaning is conveyed through a message, is explained in the diagram 2-3 on the next page. Figure 2-3 shows there is a definite relationship between the referent and the reference (idea, image, and thought), since the reference could not occur without the referent (object, or concept). Such relationship seems to exist between symbol (code, sign, and signal) and the reference. Since reference in order to convey information (meaning) must embody itself in the symbol (code, sign, and signal). But the relationship

^{*}It is the common referent, that the source and receiver have in their sets of experiences, that make messages meaningful. The common grounds can only be set when their experiences are similar or when their empathic psychological sets are similar.

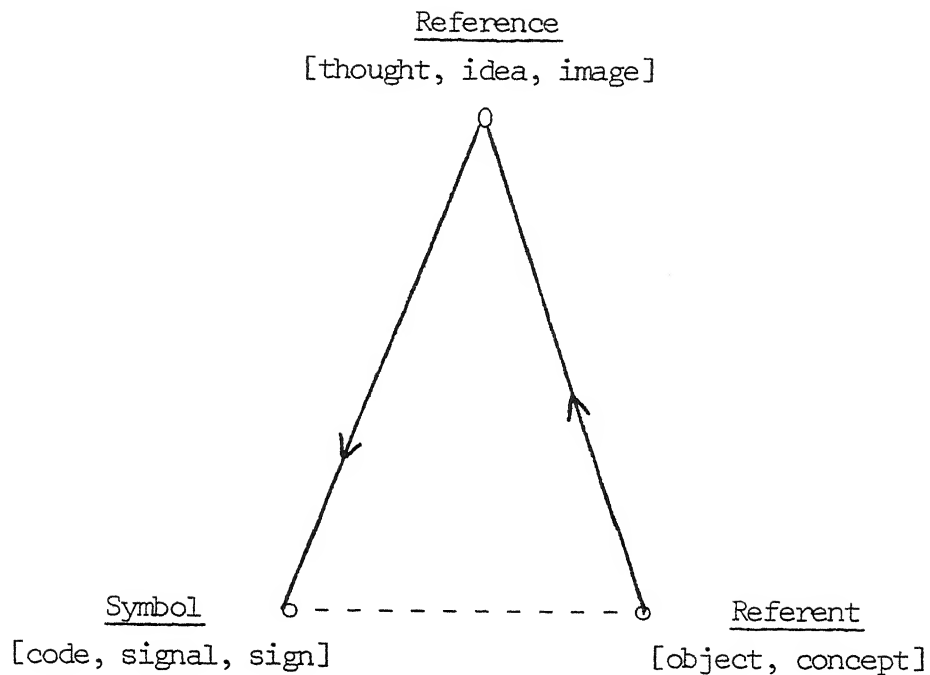


Figure 2-3. Communication and Meaning

between the symbol and the referent seems to be an arbitrary, temporary, and imputed one only.*

Meanings refer to some idea (thought or image) of the communicator for which he has some referent. He transfers this idea through symbols (a commonly-used symbol is language, either spoken and written) to the communicatee. The communicatee in turn has some reference to the idea. The closeness of meanings are expected to make the communica-

*An example of this point is a very commonly-argued use of the terms "management" and "administration," in connection with a particular type of activity. To label the use of one or the other as right or wrong is useless. It is the nature of the referent itself, not the choice of symbols, that matters more. Everything hinges on the matter of definition. But it is not the words that need to be defined, but the referent itself, "the reality behind the words."

tion more effective.

Hence, we see that meanings add a quality dimension to communication. The quality of communication is believed to increase when two people understand each other, and have meanings for what the other is saying.*

COMMUNICATION AND MANAGERIAL CONTROL

The quality dimension added to communication by meaning has important implications for control, which uses communication as one of its basic tools. Control (by management) through communication involves the quality aspect as to how "effective" the transaction is between the manager and the managee. Such effectiveness, in turn, depends to some extent on an understanding that one person has about the other, and on how well the information transferred is able to elicit confidence in the other person. Implied in the above is the intent of the sender of information, that the receiver may change his behavior upon receiving the message. This notion, in essence, is the definition of communication used in the present analysis, whereas control includes the planning, adjustment, and correction and evaluation of parts in the organization.

In Chapter I, we showed that communication is the very core of management. We find that managerial activity depends upon the organization's communicability to provide problem-solving and guidance.

*The similar notion is implied in the phrase "receiver-orientation," often used in manuals of how to establish "good communication" in organizations. The so-called "generation gap" issue, it seems, has at its core the problem of lack of a common referent by the two age groups. Another example is that of field studies, in which the attempt is to have interviewers who can "talk the same language" as the respondents they interview.

As Deutsch (1952) points out:

Communication and control are the decisive processes in organizations. Communication is what makes organization concern; control is what regulates their behavior. If we can map the pathways by which communication is communicated between different parts of an organization and by which it is applied to the behavior of the organization in relation to the outside world, we will have gone far toward understanding that organization (Deutsch, 1952).

Communication and control are closely related in organizations, as communication provides information on the result of the operations carried out. The information provided is basic to the control process. Also, communication provides the manager with information, which is necessary for manipulating and exerting influence on the organizational environment. So in essence, the information provides managers with control tools, which give them power.*

Communication is an important factor in the effectiveness of top control. The exercise of control implies that the wish of a superior, whether it takes the form of a command or a request, is communicated downward; and the compliance is reported upward through the communication channel. Accurate and effective functioning of communication networks leads to a high measure of understanding between an executive and his subordinates, and this is basic to an effective control device.

In summary communication and control, in the context of management, seem identical. Control is communication, or in other words,

*Communication implies control in the business organization, as some theorists have maintained: Weiner, 1954; Berlo, 1970; Albert, 1970. They say information has tremendous control value. "Management uses the information to control the environment. . . . Communication is the mechanism by which power is exerted" (Schachter, 1951).

communication is controlling the behavior of other individuals, in the desired direction. Control is exerted through an information transfer of work performance, operations completed, and the success or failure in achieving a particular task. Control also implies a corrective course of action which is usually suggested after joint consultation promoted in the organization. Control and communication involve understanding, if effectiveness is the goal of evaluation.

INFORMATION SYSTEMS OF MANAGEMENT

Information is what gets communicated. In business, one finds that there are various types of information required: at times, factual, in the form of data; or it is in the form of records of performance, sales, loss or profit statements; or it is in the form of future plans and designs, etc. These various types of information for decision-making are chosen on the grounds of relevance and adequacy that they are for the manager.

The question is: Why do we need information in an organization? The answer is that information is needed to take a definite step about a matter and to minimize uncertainty. We have seen that information is patterned matter-energy that is communicated from a sender to a receiver, and which conveys some meaning to the receiver. Information is important for a manager's work. As mentioned in the previous section, the possession of information enables a manager to control.

There are various methods, like oral and written, through which information can be conveyed. Information serves various functions for management; it may help production, or encourage new ideas, or maintain

efficiency, or convey some achievement to a particular employee, etc. Also, communication may be coming from the top or from the bottom or it may be required from peers. All these, and many other, ways that information can be conveyed, depends upon the system of information that management has established.

Information system means that management has a set of defined ways in which information is conveyed from one point to another and that there is a definite relationship between the type of information conveyed, or requested, and its source and receiver. The information system lends the organization a systematic way to observe, analyze, evaluate, and make necessary changes in organization. In the organization, the information system provides a special method for identifying information flows associated with decision-making activities of the organization; it evaluates information flows and designs new information flows to fill the gaps.*

Organizations have three models of information systems that accumulate, process, and transmit information: (1) the traditional information system, (2) the operation and production information system, and (3) the marketing information system (Prince, 1970).**

*The person who analyses and designs information flows is called a system analyst, he is trained to observe certain manifestations of the organization. He specifies the information requirements in each decision-making activity, and lists the data sources that are available or could be made available for satisfying these requirements.

**The traditional information systems are responsibility and profitability accounting, PERT, CPM, etc. The production and operation systems are inventory management, operation scheduling, etc. The marketing information systems are those dealing with sales, future products, price projection, etc.

The information systems approach points out various types of information that flow in the organization.* In Figure 2-4, Kast and Rosenweig (1970) show some of the more crucial flows which management needs. Management establishes objectives within its frame of reference in terms of premises, such as government relations, political conditions, market situations, etc. Then plans for action are sent for storage and to the control systems for later comparisons. Feedback is obtained on the output of the system in terms of its quality, quantity, and cost. Operating systems collect data for processing, analysis, and feedback to the control. Summary and exception reports are prepared by the control system for needed change and/or adaptation in plans. Subsequent planning reflects such feedback, and the entire process is repeated.

We summarize: Information is essential for management, as it facilitates the manager's work as controller. Information is of various types. Each department has its own system of managing information. That is what is known as the information system for management. The manager's job is to be able to observe, analyze, correct, and utilize relevant data for decision-making. The problem relates to identifying, analyzing, and making use of the information in decision-making.

Summary

The section on communication in Chapter II deals with communication as a process which occurs within the context of the system. This

*Some theorists view organizations as a series of large networks connecting the requirements in each decision-making process with the sources of data that extend throughout the organization. In large and complex task organizations, different operations can be described as separate information networks with one overall information network superimposed on top of the individual information networks.

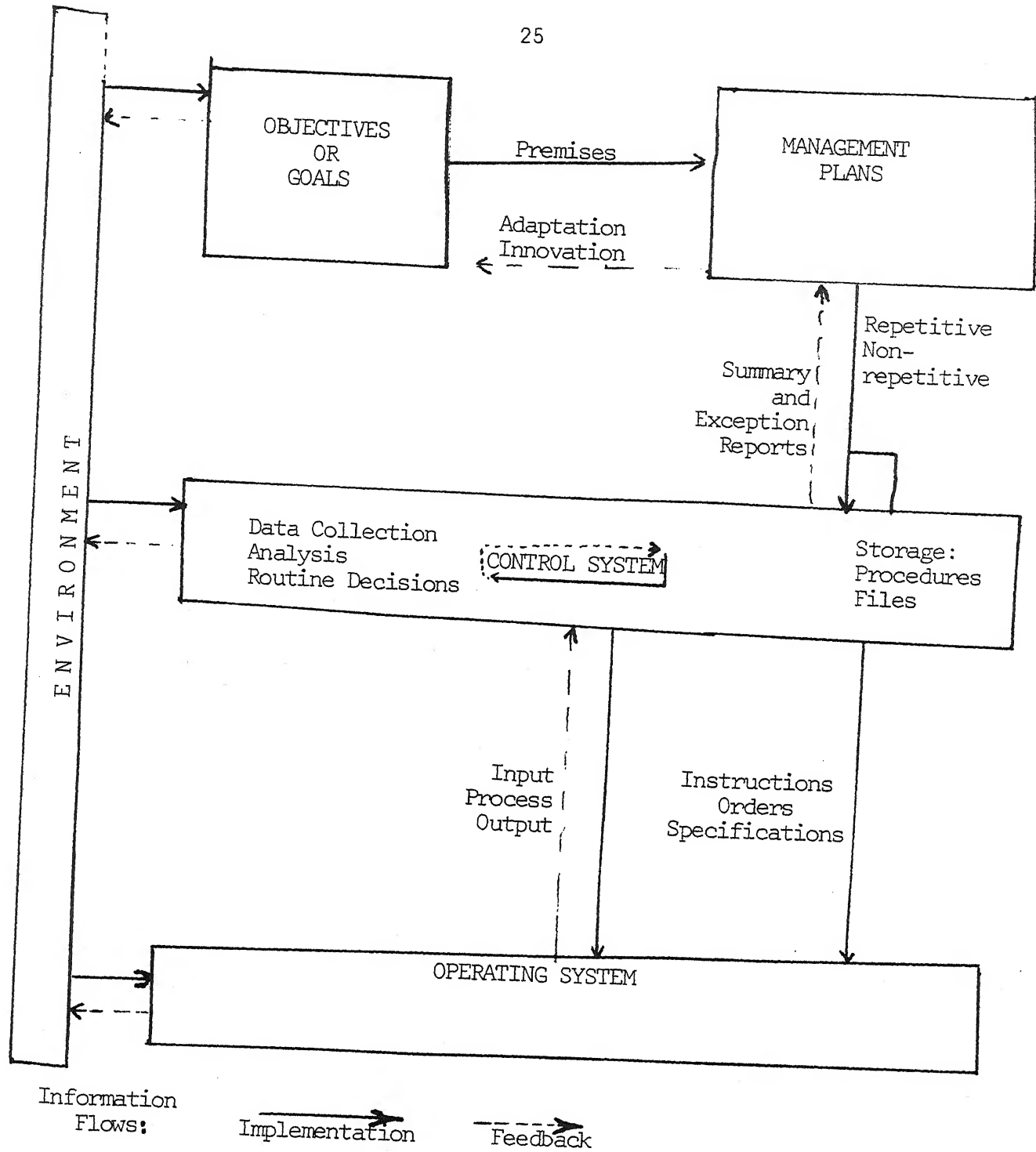


Figure 2-4. Information Flow in an Organization.

system has been modeled in many ways. The source, the message, and the receiver are the most essential components for the activity of communication. Among the senders and receivers of messages there is a shared or common goal of experience assumed, which attaches messages (composed of symbols) to some referents in reality with the help of its reference idea, image, or thought. Meaning is important if the message is used to control people in the organization. Control is an important part of a manager's work, which is facilitated by possession of information on his part. Information gives him the power to control. Thus information becomes very specialized. Various types of systems process, analyze, and diffuse information to receivers. Hence, many flows of information emerge on the scene. All these are incorporated in the information system which management uses to assimilate various types of information for the purpose of decision-making.

SYSTEMS' VIEW OF ORGANIZATIONS

Organizations represent a system of individuals who are brought together to achieve through a hierarchy of ranks and division of labor, a common predetermined goal or purpose. An organization is a system, as is communication (as we mentioned previously). Both organization and communication are systems, as they refer to a set of components, the relationships among them, and the functions they serve.

The systems approach (and associated views) have become the operating framework for many of the physical and social sciences in recent years. One cannot but agree with Chin (1961, p. 202), who says:

Psychologists, sociologists, anthropologists,
economists, and political scientists have been 'discovering'

and using the system model. In so doing, they find intimations of an exhilarating 'unity' of science, because the system models used by biological and physical scientists seem to be exactly similar. Thus, the system model is regarded by some system theorists as universally applicable to physical and social events, and to human relationships in small or large units.

The systems approach has been utilized by writers as early as Barnard (1937), Homans (1950), Simon (1958), Churcham (1957), Selznick (1948, 1949), the Tavistock Group (1960, 1963, 1965, 1961, 1967), Parsons (1951, 1964), Sayles (1964), Katz and Kahn (1966), Scott (1967); and by some recent authors like Perrow (1967, 1970), Wenninger (1968), and many others.*

The systems point of view of organizations suggests that an organization encounters uncertain, ambiguous, and dynamic situations. Management is not fully able to control all of the factors of production (as traditionally viewed), as there are many environmental and internal factors influencing these factors. The constant interaction between the environment and the system, and the fact that they co-determine each other, leads to the "openness" of the system.**

*Writers have used the systems framework to explain their particular point of view. Simon and March view organizations as complex systems of decision-making processes. Churchan used the systems approach in the context of management science. Selznick used the systems approach in his classic study of the TVA, and pointed out that organization must find an adjustment between their internal and external environment. The Tavistock Group, working on human relations aspects of industry, applied this view in studying organizations. Some more well-read writers are Emery and Frist (1960), Rice (1963), Woodward (1965), Burn and Stalker (1961), Lawrence and Lorsch (1967); Parsons used it while delineating the features of his paradigm, and his three levels of managerial systems.

**Modern organization theory has moved toward the open system approach. "The distinctive qualities of modern organization theory are its conceptual-analytical base, its reliance on empirical research data,

The system is open to changes in the environment and reacts to such changes.* The open systems view has been recently studied in a detailed manner by social scientists at the University of Michigan, such as Katz and Kahn (1966).

They depict open systems** in terms of their input, throughput, and output. (Figure 2-5.)

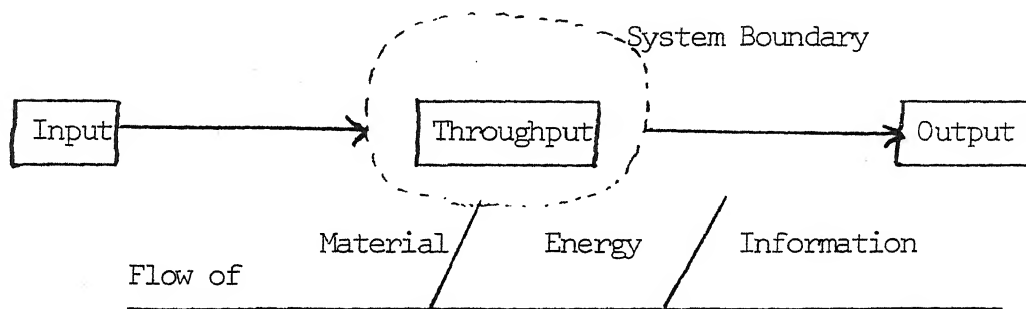


Figure 2-5. Open Systems.

and, above all, its synthesizing, integrating nature. These qualities are framed in a philosophy which accepts the promise that the only meaningful way to study organization is as a system" (Scott, 1967).

*There are three basic assumptions that seem to be underlying the view of organizations as systems: (1) that organizations are composed of a set of interdependent parties; (2) they have needs for survival; (3) and organizations behave and take action.

**There is a controversy among theorists about labeling a system as open or closed. The term "open" refers to the fact that a system is in contact with its environment, with input, and output across boundaries. What then is the use of talking of closed systems? Closeness of a system refers to the fact that a relatively little, if any, commerce occurs across the boundary. But we know that in reality no such system exists. But it provides us with an important way of analyzing a system. A system is viewed as if it were closed so the operations can be studied only on the basis of pre-established factors. Classical examples of the above are: Economic analyses models. Economists have long been accused of being "arm-chaired theorists," and not taking into account the changes in environment.

Figure 2-5 illustrates the point made previously that an organization acquires inputs--men and materials--from the larger environment, and converts this input into output. The output again goes back in the environment from where it came. Katz and Kahn (1966) suggest nine characteristics that "seem to define all open systems . . . importation of energy . . . the throughput, output, a cycle of events, negative entropy, information input, the steady state and dynamic homestatis, differentiation . . . and equifinality."

All the above nine elements are present in varying degrees in all open systems. Open systems are also characterized by several subsystems, which operate within the large system (Figure 2-6).

Open systems have various subsystems, like maintenance, production, adaption, etc.* These subsystems perform various functions in order to obtain goals. They are integrated, as Quinn and Kahn (1967)** suggest, so that "each organization may best be characterized as an aggregate of structures; for example, a power structure, a communication structure, a friendship structure, etc. . . ."

Hence, organization as a system stresses the way in which the action of the parts is structured, by the systems' need for stability, and it emphasizes the process of integration and adaptation, so that

*Another category of subsystems is provided by Parsons' three levels of managerial systems: (1) technical system, (2) organizational, and (3) institutional. These three are part of a larger system called managerial system which spans the entire organization by directing the technology, organizing people and other resources, and relating the organization to its environment.

**Guetzkow (1965), Mulder (1960), and Cherry (1957) propose the same as the above, and in addition suggest that there is a superimposition of other structures on the communication structure.

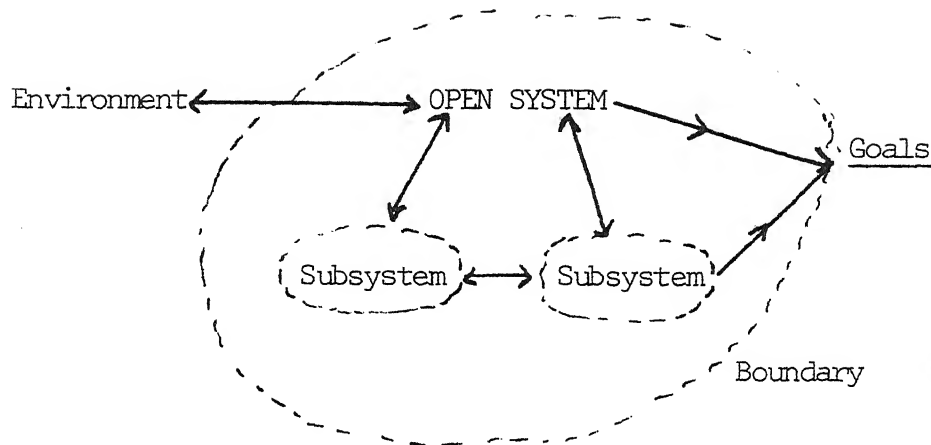


Figure 2-6. Sub-Systems in an Open System.

the predetermined goal can be achieved.

In essence, an open system is in constant commerce with its environment. Environmental occurrences have an impact upon the organization's operations, which are carried on by the various integrated subsystems within the organization. It is important here to note that the manager's job in these "changing boundaries"* situation becomes very uncertain, and an ambiguous one. He has to deal constantly with changes in the environment and review his plans of actions and alter goals in the light of recent developments.

*It is believed that a manager's job has become more difficult now than ever before. He does not have clearly-defined boundaries within which to operate. Rather, he is placed in a network of mutually-dependent relationships. His objective becomes that of building and maintaining a predictable and reciprocating system of relationships. Since the parameters of the system (the division of labor, and the controls) are evolving and changing, it is like seeking a moving equilibrium. Thus the manager endeavors to introduce regularity in a world that will never allow him to achieve that ideal. He learns to compromise, and optomize, rather than maximize.

The following points about the systems' perspective seem most important: (1) organizations and communication both are open systems, (2) open systems, like organizations, are interacting with the environment constantly, and are affected by changes in that environment, (3) the organizational system is divided into many subsystems, which are interdependent and co-determine each other, and (4) organizations attempt is to integrate the various subsystems to achieve their goals.

Communication Subsystems of Organizations

The subsystems are the constituting elements of a larger system, known as an organization. The communication, authority, power, influence, and production are various subsystems which, when aggregated, make up an organization. An organization is a system of individuals who are brought together to achieve, through a hierarchy of ranks and the division of labor, a common, predetermined goal or purpose. Within the system of an organization, communication subsystems exist. Communication is the transmission of an idea from a source to a receiver with the intention of influencing his behavior.

It is believed that a communication subsystem of the organization (like other subsystems of authority, control, power, friendship, etc.) determines an organization's structure. As noted by Jacobson and Seashore (1953): "Organization structures can be conceptualized in terms of communication events which connect pairs of individuals, and thus establish patterns of contact among individuals and among groups."

Defining the communication subsystem as a dimension of studying organization structure, is a recent development.*

As more and more knowledge is obtained about communication subsystems through practice, testing, and theory-building, it becomes difficult to reject the proposition that there exists a definite relationship between an organization's structure and the communication system.** The relationship is apparent, when formal structure uses various channels to communicate about a variety of situations. Indirectly, the formal organization chart shows the major communication flows and connections, designed by management. Informal organizations, irregular flows of information, overloaded receivers of communications, and informal leaders, also are suggestive of the interdependence of

*The concept of authority and control have long been given major importance in the analysis of interpersonal relations in organizations. Whereas communication, friendship, work flow, dependence such other dimensions have been neglected. The inclusion of these additional considerations has two implications: First, organizational subsystems may be formed with reference to only one or a combination of these dimensions; secondly, a more important implication is that for a given organization, there is no such thing as a structure, but each organization may best be characterized as an aggregate of structures (for example, a power structure, a communication structure, a friendship structure, etc.). Each organization member may thereby be viewed as occupying positions in a number of such structures, not all of which can be understood in terms of formal authority or superior-subordinate relations. Cherry (1955) and Jacobson and Seashore (1955) both conceptualized organizations as an aggregate of structures (different from the traditional view of structure being the formal role relation depicted by the organization chart).

**Deutsch (1952) suggested that the organization structure might follow the development of communication system, rather than vice versa. For many organizations, communication systems have been designed to follow organizational lines without considering the fact that this may not provide the optimal flows of information, or may lead to inefficiency in other subsystems of the organization.

communication and organization.

It has been mentioned earlier that an organization is a system of individuals who work toward some predetermined goal or purpose. The system of organization is an aggregate of various interdependent subsystems.* When the organization faces demands from the environment requiring changes in goals, an organization manipulates the following three dimensions: (1) the organization structure, (2) the technology, and (3) people.** The manager faces a difficult task trying to incorporate changes through one of three available possibilities: Structure, technology, and people. Since all are interdependent subsystems of the organization, change in any one of these would tend to change the other two.

For example, if one wants to analyze and observe the communication structure of a particular organization, one can not do so in a vacuum. The structure has to be studied as an interacting and an

*Various authors have studied different types of subsystems. Subsystems of authority, and division of labor is one line of interest; some are interested in the system of communication; others in the system of motivation; still others in the system of production and distribution; subsystems of finance, requisition, and maintenance of resources, forecasting, research and planning, and integration, represent several more subsystems studied by writers in the context of the larger structure of an organization.

**Leavitt (1966, p. 325 mentions that the organization structure, technology, and people are three alternative ways to manage changes in a volatile organization.

interdependent system.* Authority and power structures may have a direct impact upon the functioning of the communication networks; similarly the nature of technology may have a decisive influence as to which channels are more readily used by top, middle, or the lower echelons of management.

In summary, communication subsystems are: (1) essential as part of an organization's structure, as are its authority, power, control, and work flow structures; (2) subsystems are interdependent and together constitute the structure of an organization, so that changes in one subsystem may lead to changes in the other subsystem; (3) the manager's job becomes one of maintaining the balance and predicting the nature of relationship among subsystems; and (4) the communication subsystem can only be studied in relation to other subsystems, not without them.**

Nature of Management Communication

Communication is the transmission of ideas from a source to a receiver, so that his behavior may be influenced. Management means

*This is possible only when one thinks of an organization's structure as an aggregate of subsystems, which are overlapping and interdependent. A communication system is interrelated with other systems, with the aid of such processes (as Bakke has suggested) as "bonds," and (as Dubin suggests) with work flow, power, and authority relations, etc., and (Likert mentions) the "linkage" approach.

**It has been said that in the theory of organizational communication, communication subsystems can be accepted as basic structural characteristics. But in order to understand the working of the communication subsystem in the absence of authority, status, prescribed functions, spatial relations, etc., seems almost impossible. One has to superimpose these other structural characteristics upon the communication patterns in an attempt to explain the variance found in the functioning of the communication subsystems.

planning, decision-making, coordinating, controlling, and commanding the activities of an organization. Communication galvanizes the elaborate system of relationships between individuals and departments, as it underlies planning, decision-making, coordinating, controlling, and commanding of activities in an organization.* Management communication is a transmission of ideas from individuals in various departments to other individuals of various departments, with the intent of influencing their behavior. The purpose of management communication is: (1) to effect changes in behavior (relating to planning, decision-making, coordinating, controlling, and commanding); and (2) to coordinate and direct these behaviors toward the achievement of organizational objectives or goals.**

*It is now generally accepted that all organizations--including the largest conceivable organization, the machinery of government civil service--depend ultimately for their existence on the ability of human beings to communicate with one another. It is the quality of communication that finally determines the efficiencies of a company. Neither company policies nor the quality of its management ensure efficiency. It is only effective communication which can turn policies into practice, and management efficiency into concrete results.

**It has been said that communication serves very fundamental functions of direction and coordination of various activities of management. An illustration of this point is a relatively decentralized organization which is: (1) more decentralized, (2) requires greater delegation of authority, (3) and has an increased necessity for linking its subsystems. Communication essentially deals with issues of greater interconnectedness among subsystems, availability of relevant information at the right time and at the right destination, and constantly reviewing the activities so that the organizational goals do not get sidetracked. In short, the manager devotes most of his time to directing the activities of the various subsystems and coordinating them across subsystems, so that the organizational objective is not undermined. The communication system's management seems closely related to the structure of the system. The structure is, of course, dictated by the needs of the firm. Hence, it may be said that there are as many different kinds of structure as there are firms, and obviously many more different kinds of management communication practices.

Management's broader objective concerns running an efficient organization, based upon human relations consideration of the employees,* and meeting local, national, and international needs for goods and services. Management's communication is thus directed towards internal goals as well as external. The external environment consists of management's communication with stockholders, clients, suppliers, advertisers, and the public in general. Whereas internal environment is made up of daily contacts with officers, individuals in the management cadre, and employees of the organization. External and internal contacts both have some common features that management (when communicating with them) must be attentive to.** Both are characterized by new norms of information availability, in larger amounts, with greater clarity and specificity. Management communication, it is felt, must attach its contents, facts (numbers or words), and alternative sources of further information. Also important is the demand

*Both employees and management have their sets of objectives, which may be in conflict. The notion of a psychological contract, used by neo-classical thinkers, is that both parties have certain mutual obligations which need to be fulfilled. Management satisfies its part of the contract by providing employees with good working conditions, interesting job, good pay, benefits, etc. It also expects that employees should help achieve the organization's goal. The employees fulfill their obligations by doing good work, being creative, etc. The result is not always positive.

**Management communication is becoming a separate and specialized subsystem of the organization. This subsystem specializes in types of audience, the language to use, construction of messages, contents to be conveyed, the format of the text, method of communication, and appropriate time of message delivery, etc. In essence, management communication deals with the strategy aspects of communication, as well as management. A strategy is a course of action planned and executed in order to give impetus to an already existing activity or a course of action. Strategy is situation-bound in the case of management communication. Strategy is usually designed to manage a particular situation within a given time span.

for faster, efficient, and effective channels of communication from management to the employees, and to the external members of the organization.

Summarizing the present discussion, the following important points emerge: (1) management communication is the transmission of information from a source to a receiver, (2) the intent of the communication is to effect change in the receiver, (3) the basic functions of management communication are to direct and coordinate managerial activities toward the achievement of organization's goals, (4) management communicates with both external and internal audiences, and (5) management communication is becoming a very specialized subsystem in organizations.

Summary: In the present chapter we discussed how the system's view is a useful way of studying organizations. Organizations, viewed as systems, are a set of interdependent components. The components serve a function and comprise the structure of the system. Systems are open, as they are constantly interacting with their environment and making alterations as demanded by changes in the environment. Systems have subsystems that are interdependent and have various functions. Communication is one of the many subsystems of organizations. The communication subsystem determines the structure of an organization, and vice versa. The communication subsystem interacts with such other subsystems of authority, power, influence, friendship, work flow, etc., and a change in one leads to a change in others. Hence, a manager's job is to predict and manage these changes.

Finally, management communication is the transmission of ideas from a source to a receiver, to change his behavior. Management communication performs two very fundamental functions in an organization: Change, and direction and coordination. Organizations have a set of objectives which need to be achieved. The efforts of the system in managing its subsystems and individuals, through communication, is to alter goals--as the environment demands, in order to reach objectives effectively and efficiently.

CHAPTER III

A CRITICAL REVIEW OF STUDIES ON COMMUNICATION RELEVANT TO ORGANIZATIONAL COMMUNICATION

Purpose

The present chapter has a very essential purpose in the study. The chapter, by critically reviewing the literature representing various viewpoints of communication, draws relevant points relating to organizational communication. Organizational communication theory is evolving, but there is not a single theory of organizational communication per se on which to base research studies. Hence, the present study draws from various available theories of communication (in a variety of interrelated disciplines) that are examined in this chapter. The review of studies, besides broadening the general framework of communication and organization, as previously established, brings the issue of organizational communication in focus. The studies are categorized on the basis of a particular stand that each has taken regarding communication. The six categories are: (1) psychological, (2) sociological, (3) network studies, (4) grapevine or rumor studies, (5) functional-operational studies, and (6) studies in theories of organizations. Each of these studies is first treated individually, and at the chapter's end, they are compared with respect to some common variables.

Psychological studies: Several psychological studies have clear relevance for communication behavior in organizations. Attitude studies, cognitive theory and research, and the total scope of research and theorizing on the social determinants of individual behavior are of considerable relevance.*

The role of communication in influencing attitude change is studied in terms of source-credibility (for example, whether the source is trustworthy or not). The trustworthy source produces more change, compared to an untrustworthy one, but the amount of information the receivers obtained was the same for both sources.

Studies done by Hovland, Janis, and Kelley (1953), studied systematically the role of the communicator in the process of persuasion. They found that the characteristics of the communication determine how believable he is, especially his expertness and trustworthiness. Asch (1952) found that there is a constant interaction between communicator credibility and the communication message that he delivers. He found that the meaning of the communication is partially determined by the reputation of the person who makes the statement. Osgood and Tannenbaum (1955) found that where the listener tends to

*Attitude refers to certain regularities of an individual's feelings, thoughts, and predispositions to act toward some aspect of his environment. For an extended technical treatment of the term, refer to Sherif and Cantril (1945), Krech and Crutchfield (1948), and Scotland (1952). Cognition is the state of knowing some information. Some of the theories dealing with communication are as follows: Newcomb's (1953) theory of symmetry in interpersonal communication, Rosenberg's (1957) theory of affective-cognitive consistency, Festinger's (1961) theory of cognitive dissonance, Katz and Scotland's (1952) motivational theory of attitude change, Kelman's (1953) three process theory of attitude change, and Osgood and Tannenbaum's (1955) theory of congruity.

favorably evaluate both the communicator and his communication message, but in different degrees, the difference will be resolved by shifting both evaluations toward each other.

The effectiveness of the message, these studies show, depends in part upon certain factors within the receiving individual. These include selective exposure to communication, [Katz and Lazersfeld (1955), and Campbell (1960)], the immunizing effect of exposure, motivational resistance to changing certain attitudes,* and cognitive balance as a source of resistance. According to dissonance theory, a person seeks information if he expects it to reduce his dissonance and avoids information expected to increase dissonance (Festinger, (1957)).

To the extent that the individuals change their attitudes as a result of identification or internalization, the change is more likely to be permanent. In internalization the induced opinion or behavior is consonant with the individual's value system and persists as long as he holds those values. This introduces a time dimension in studies measuring attitude change, and has great relevance, in terms of designing communication strategy for a program of changing attitudes, and also in terms of the costs involved in an organizational context.**

*Hovland, Lumisdaine, and Sheffield (1949) found that when a person is exposed to both sides of an argument, the belief he accepts will be more resistant to change, than if he has been exposed only to communication messages agreeing with his beliefs.

**Studies measuring change in attitude along some time dimension have relevance to organizations, as change in opinions seems to be more likely immediately after the message and the individuals gradually move back to their original position.

Several principles have been developed with respect to the effects of the distance between the position of the communicator and that of the recipient, that have important implications for communication across levels in organizations. The positions of the communicator and receiver are not the same. The assimilation and contrast bias determine potential effect that communication might have upon the respondent.* An illustration are personality differences between the source and the receiver, or the variance in their organizational ranks, that determine the response as well as the interpretation of communication messages.

The authoritarian and non-authoritarian personality type respond to communication differently. It is likely that the authoritarian members may stress power and status as central values in the communication mechanism, and accept more readily the messages coming from authoritarian individuals in the organization, and develop prejudiced for messages coming from non-authoritarian persons.** Members of the organization who are more authoritarian would likely assert their power and hierarchical position in their communication behavior in general,

*The evaluation of communication is related to the distance between the position of a communicator and the communicatee. There is a range within which positions vary but are still evaluated as fair, but when outside this range of acceptance, are evaluated as not favorable. Similarly, a range of rejection also exists.

**A non-authoritarian person might be expected to be less susceptible to influence from an authoritarian communicator; hence, the response is less likely. Further, it is believed that it is difficult to change some attitudes because they have an "ego defensive" basis. Sarnoff (1960) stresses that these attitudes are not amenable to change through ordinary methods. Direct persuasive methods are ineffective or, in some instances, result in a strengthening of the attitudes.

and use formal, written, and a prescribed format of communication with other members. Whereas less authoritarian individuals may not stress position so overtly in their communication behavior.

Summarizing the above studies, the following points seem to have important implications for organizational communication: (1) characteristics of the source, message, channel, and receiver, determine change in attitude, (2) more information does not necessarily mean an increase in the effect of a communication message on the receiver, (3) individuals change attitudes not because the message is persuasive but because their personality and social characteristics factors give them an impetus to change or not to change, (4) the "consistency" model of change has relevance to the process of communication as it helps to predict a person's response to communication messages based on his previous attitudes toward the source, the content and subject of the message, and the direction of pressure in the message.

Sociological studies: The previously mentioned set of psychological studies focus primarily upon the individual, his attitude organization and structure, his responses to varying aspects of the communication situation, his persuasibility as it relates to his personality, and the process by which he resists change. But individual behavior cannot be studied in isolation. He, his personality, and his responses should be seen in a social context.

The vast accumulation of literature* on mass communication has great relevance for the study of communication within social structures.

*Weber (1927) is the earliest sociologist whose main thesis revolved around organization structure, administrative efficiency, and

The older view of persuasive communication looked upon individuals as a mass of millions of readers, listeners, or movie-goers, who were ready to receive and respond to every message that they received. But research over the past two decades* was made clear that the effect of a communication depends upon the communicator's and the respondent's place in the social structure and their relations to other persons and groups. As Berlo (1960, p. 149) puts it: "Knowledge of a social system can help us to make accurate predictions about people, without the necessity of empathizing, without the necessity of interaction, without knowing anything about the people other than the roles they have in the system."

The above discussion brings out that in organizations the nature of the communication environment is dependent upon the social images of people and their roles in various groups to which they belonged to. Also, groups may act as reinforcing or interfering agents, with regard to the effect of communication. The group structure may effect the direction, speed, and accuracy of communication, by controlling the exposure to the various elements in the communication message by certain members.

the process of communication. Caudill (1958), Revans (1960), Blau (1962), Georgopoulos (1970), in their studies on hospitals, formal organizations and bureaucracies, have considerable significance for communication in organizations. Katz and Lazersfeld (1954) provide a useful analysis of social communication and interaction. The tradition of diffusion studies, recently assessed by Katz, Levin, and Hamilton (1963) and Rogers with Shoemaker (1971) provide many clues to the study of communication in organizations, as do the field works of Lionberger (1960, 1967), Menzel and Katz (1956), Carlson (1965), and many others.

*Merton (1957, p. 234) studied behavior in terms of groups that individuals use to regulate their conduct: Eisenstadt (1953, p. 369) reports that openness or resistance to communication were largely regulated by group affiliations; research by Sherif (1936, p. 178) testifies to the ubiquitous and potent influence of groups on individuals' behaviors; also St Ravss (1959, p. 57) stresses the importance of social structure in the following lines: "The interactional situation, is not an interaction

Reference groups, which provide a frame of reference for individual's self-evaluation and attitude formation, play a similar part to other small groups. They provide individuals with norms and standards of social acceptance and a framework within which communication is received and interpreted. But reference groups do not always influence the communication act.

Another area of study which has relevance to organization communication, deals with the larger communication process by which messages travel from the mass media or other general sources to ultimately reach an audience. There is a belief that communication messages get modified, or reinforce opinion, although in an indirect manner known as the two-step flow of communication.* Lazersfeld, Berelson and Gaudet (1948) observed that with regard to voting, the mass media exert influence mainly through the mediation of opinion leaders. Opinion leaders, it has been found, influence individuals' behavior with regard to incoming communication messages, and acceptance and rejection of certain ideas. Opinion leaders seem to have more information than others, greater expertise in a certain area, greater access to more recent and relevant information; hence people seek them for advice. Similarly, in an organization, like in a social system,

between two persons, merely, but a series of transactions carried on in thickly-peopled and complexly-imaged contexts."

*Investigations of the process of diffusion or spread of new elements through a population have added considerable detail to the notion of the two-step flow (Katz, 1957); Menzel and Katz, 1956; and Rogers and Beal, 1958). Whether a person gets information directly from the mass media or indirectly through other persons is determined by his position in the social structure. Where there are close interpersonal relations, influence is exerted more through interpersonal channels of communication (Menzel and Katz, 1956).

there are leaders whose opinion is sought for.* Management's link to the employees is the leader, who may not be formally assigned, but chosen informally because of his expertise, or his powerful position in the informal group. Opinion leaders, because they personify the group values, are strategically used to influence the communication behavior of group members.

In summary, following are some important implications of the sociological studies to organizational communication: (1) the individual's behavior is determined by his social environment, (2) roles and norms of reference groups and other social groupings influence the individual's framework of receiving and interpreting communication messages in organizations, (3) the informal groups develop standards or means of communication behavior, which members observe, and (4) leaders influence the communication process in organizations.

Network studies: Communication tendencies or regularized behavior, which take various forms or shape, indicating the flow and to some extent contents of messages exchanged is defined here as network. Networks emerge due to communication tendencies or regularized behavior and take various forms or shape, indicating the flow and to some extent the contents of messages exchanged.

*Example of this is the informal groups and the powerful member who runs the show and determines "happenings" in an organization. The leader controls and regulates the behavior of other members; they listen to him, follow his command, and come to him before taking any course of action relating to their work. Also, it has been found when there is a conflict between management and labor, it is the informal leader whom the management wants to convince and communicate with so that he can convince the fellow employees to give in or come to some agreement.

Communication networks provide a very essential, but largely neglected, aspect of the organization structure. Communication networks indicate patterns of friendship and close association and flow of work; in essence, how communication actually works compared to what it should be as depicted by the organizational chart.

So communication events connect pairs of individuals, and the pattern of contact that emerge among individuals and groups show the actual working of organizations. Individuals, it has been observed, select whom they talk to, and further their position and function in the social networks condition their selection behavior. As Barland (1968, p. 227) indicates:

They carefully accept those with whom they interact and ideas and feelings travel among well-established interpersonal channels. These pathways determine both the direction of the flow and the way it is received. To say that a communication channel connects two people or complex as official as the two people, or as complex 'table of organization' that regulates interaction in a government agency.

When messages are sent and received in a systematic manner, patterns of interrelation among the nodes develop. Such transactions over a period of time generate expectations which have the force of custom. A variety of small groups studies by Bales and his colleagues (1951) suggest that social communication processes are characterized by regular initiation-response tendencies.

This viewpoint leads to the importance of spatial characteristics of the organization within which communication is embedded. As Thiller (1951, p. 262) pointed out: "When a large number of people belong to the group, it is reasonable to assume that the likelihood of a message

passing from one person to another is inversely proportional to the distance between them. The greater the distance between them, the lower the traffic density."* Hence, whether two employees interact or not is dependent on their closeness of distance. But distance alone does not explain why members interact. The group dynamics studies offer an explanation that members interact with those towards whom they feel attracted, and those they like. One of the results of high member attraction toward one another or group is an increased communication rate.**

Networks provide various channels of communication in an organization. These channels are either formally prescribed or they emerge due to informal contacts among employees. The members' position in the hierarchy and perception of one's position within the status system influence the extent to which one utilizes various types of channels.

*Researches done by Blake et al (1956), Caplow and Forman (1950), Lundeborg, Hertzler, and Dickson (1949), Merton (1948), Powell (1952), validate Thiller's reasoning. Barlund and Harlund (1963, p. 468) conclude a review of empirical studies. "An inverse relationship has been found between the physical distance separating persons and the likelihood of communication between them, with interaction increasing as distance decreases." Also Gullahorn (1952, p. 134) found that, "Distance was the most important factor in determining the rate of interaction between any two employees."

**For a summary, synthesis, and analysis of small groups, see Altman and McGrath (1968). The small group studies indicate that networks emerge due to the fact that in small groups, people are attracted toward those who they think like them. Fewer communication difficulties, less aggressiveness, and defensiveness is shown and more positive interpersonal relations are evident. Beginning from Lewin (1939), Moreno (1934), Bavelas (1948, 1950), Leavitt (1951), Shaw (1954, 1955, 1956, 1958), Lenzetta (1954, 1956), and many others studied communication nets small groups and the effects of nets on group performance and satisfaction. These studies assume that formal organizations do not allow for the emergence of "natural" networks, instead they have prescribed networks.

Members use various channels in accordance with prescription of the roles.

Summing up, the following points seem relevant to communication within organizations: (1) these studies have indicated that the content and direction of flow of communication is based on groups, (2) variables like size, distance, personality, group composition, member attractiveness, etc., influence communication process as well consequences (3) communication behaviors are based on roles that individual's perform in the organizations, and, finally, (4) that they provide a way of ascertaining the effects of the restricted communication networks that categorize formal organizations.

Further, networks provides a useful way of looking at organization structure within which communication process functions. Organizations have various information flows which are designed to increase task accomplishment and introduce higher efficiency of groups. But they represent restricted communication networks. They are characterized by the size of the loop, the nature of the circuit, its openness versus closeness, and its appropriateness for the function it performs.* The success at a group task depends upon an efficient flow of information. But formal organizations do not provide for the emergence of natural communication patterns which probably is the reason for the lack of relevant information in groups, performing various tasks. The network

*For a detailed analysis, see Katz and Kahn (1965, Chapter 9). Communication, to them, "takes in" and "utilizes" the information, mediates inputs and outputs of the social system. In a social system like an organization, while doing these functions, message flow becomes regularized which "constitute restricted communication system."

research seeks to find the most efficient communication network for various types of problems under various external conditions.*

They perform and coordinate their activities in accordance to their role relationships. The prescribed roles of the various members is another determinant of the group's communication. Thibaut (1950) and Kelley (1951) experimentally manipulated the status of members in a group (and hence influenced the perception of one's role), and found the difference in the direction of communication.

The communication pattern and content are also determined by the personality and social composition mix of the group. Groups with homogeneous members are more friendly and have higher morale, while the heterogeneous groups are more likely to exhibit more conflict and competition. Hence, communication in the organization becomes very receiver-oriented, when the receiver's personality is given importance in the process of message construction. Issues like distribution of information in the group, central or peripheral position in the group, and even-numbered or odd-numbered communication points in a network, provide additional dimensions to study group dynamics, as they effect communication in organizations.

Grapevine or rumor studies: There has been little systematic study of the grapevine as it disseminates unofficial information with high interest value by informal person-to-person communication within

*There are many types of networks like the wheel, circle, single chain, mixed, etc., which are developed for various task performances with a given problem at hand.

organizations. Rumors, seem to be a natural,* but infrequent** happening within social systems.

It is believed that rumors arise and persist in social systems because of ignorance or uncertainty about events which directly affect individuals. Hence, in the organizational context, rumors occur because (1) the situation is relevant to the individual's role and position, but he cannot control the situation, (2) individuals accept the general content and distort future happenings in order to confirm the rumor contents, a self-fulfilling prophecy.

Back et al (1950) found that the speed of rumors varies from high to low, depending upon their interest value. Speed of rumor diffusion depends on (1) job interest, (2) social interest, and (3) the time involved. Caplow (1947), in his studies of rumors in a dozen company-size units during W.W. II, reported that the interest situation is created by circumstances which give impetus to rumors, and hence rumors begin to circulate.

The crucial point, coming out of all these studies, is that the degree of structuring of the channel*** varies. That is to say, in an

*Davis (1953), Caplow (1946-1947), Festinger et al (1948), Back (1950), Burns (1954), Homans (1951), Rapoport (1953), studied rumor communication and found that it appears to be a natural and normal occurrence in organizations.

**Davis (1953b) found very few rumors. In the case of a quality control problem, 68 percent of the people were aware of the information but only 20 percent transmitted it. This finding is reinforced by studies by Caplow (1950) and Festinger (1945). Caplow (1950) found that the greatest number of rumors spread in a month was 17, which is less than one per hundred men, in a dozen company-size units during W.W. II. Festinger (1945) found that a rumor which was planted in four housing residences, within the next 24 hours, was communicated to only 13 residents. So the average rate of dissemination comes to slightly more than three persons per residences.

***Channels of rumor communication, like non-rumor communication

organization, grapevine is more a product of situation than of the person.

Channels of communication sometimes are said to indicate the contents of messages. Informal communication channels usually are thought to be carrying information sabotaging authority, criticism of a certain practice, etc. But informal channels, it seems, provide individuals with certain information (or interpretations of information) which is unable to satisfy the level of information the individuals desire. So informal communication systems circulate messages of interest to the members. As messages get passed around, three types of major changes take place: (1) leveling, (2) sharpening, and (3) assimilation.* The act of assimilation seems to be the most important one of the three processes.

The conclusion drawn from reviewing field, as well as experimental, studies on communication is that as information is communicated informally, it is selectively perceived with details omitted, added, organized, and interpreted to fit the message to the prevailing attitudes and values of each communicator. By the time a message gets from the first to the fifth recipient, the contents loose up to 90 percent of the original content and the message now contains distorted and unintended material.

develop regularized tendencies or patterns. Davis (1953b) found single strand, gossip, probability, and cluster patterns among channels of rumor transmission. The most widely found was cluster.

*Leveling is the act of omission through which messages become shorter in length and simpler conceptually. Sharpening is the process of focusing and magnifying the remaining contents of the message. Assimilation is the act of transforming the contents of messages to fit the interests, habits, prejudices, expectations, and the language habits of the communicant.

The individuals, it is said, became nodes in the serial transmission of rumor information because of "person insecurity" generated by an emotionally-charged and ambiguous event. Hence, people tend to assimilate message content to their own attitudes and values. We can draw a conclusion from the above that situations that are cognitively unclear and emotionally involving, motivate the circulation of rumors, and hence leveling, sharpening, and assimilation of message content occurs.

It appears from the above conclusion that there are certain situations which give rise to rumors. The circulating agency seems to be the members of the organizations. Studies have shown that there are "active communicator" or liaison individuals* who are the most active communicators in the process of rumor diffusion. But no individuals or group are consistently liaison agents to the exclusion of all others. This implies that in an organizational context, no one group can be held responsible for the spread of unofficial information. Hence, in order to insure that rumors are not created and circulated, management must provide enough information to the employees on topics of high interests. By doing so, speculation and high interest would be controlled to some extent and the fabrication of rumors also lowered down to some degree.

This leads to the argument that in an organization where there is active formal communication there would be ineffective informal

*See the study by Jacobson and Seashore (1951) where the concept of liaison role was developed. Also, Davis (1953a) founded the "active communicator" concept, which is similar to liaison individuals.

communication. But contrary to this belief, Davis (1953b) found that where formal communication was active, there was equally active informal communication. But where formal communication was inactive, the grapevine did not rush to fill the gap; instead there simply was a lack of communication. The above finding implies that for the study of organizational communication, rumor and non-rumor communication findings (with respect to the contents, flow, structure, and channels of communication) offer similar results.

The "unofficial nature" of rumors is similar to the lack of authoritativeness of staff communication. Most of rumor or informal communication is person-to-person. Likewise, communication of the formal organization involve mostly person-to-person contacts. In the formal communication system, it has been found that the greatest amount of communication takes place at the horizontal level, even among colleagues in informal communication systems. Most communication behavior is also informal and horizontal, even though the members may be from various departments, ranks, and age.

Hence, it is clear that a comparative analysis of rumor and non-rumor communication has similar implications for studying communication systems within an organization.

It is argued that there is some merit in letting the grapevine assess the official information distribution function.* Informal

*Simon (1945) pointed out that the grapevine generally performs a positive service to the organizations. It provides an outlet for expression so the need to communicate is satisfied to some extent. Executives could use it to feel the pulse of employee sentiment. In want of sufficiently efficient formal channels through which information could be disseminated, the grapevine proves to be a faster channel of information dissemination.

channels short-circuit the hierarchical channels, but frequently are more effective in accomplishing certain purpose, than others.

In summary, the following points seem relevant: (1) the presence of informal channels of communication is a natural but infrequent phenomenon, (2) informal communication arises because of high interest value, lack of information, and/or emotional involvement in a certain situation, (3) there are no one group of people or individuals who consistently act as active communicators, (4) messages when serially transmitted lose much of their initial content, format, and meaning, and (5) both formal and informal communication systems have similar implications for organizational communication.

Functional-operational studies: In this category are those few studies which deal with communication as an essential job tool used in day-to-day objectives of planning, coordination, and the exercise of influence. Two of the earliest empirical studies by Jacobson and Seashore (1951) and Rubenstein* (1951) studied communication as essentially a job tool, used daily in the performance of organizational task.

The study by Jacobson and Seashore (1951) is significant for our present work. The authors presume that the structure and function of communication events are interdependent, and that the organization structure is composed of dynamic patterns of communication events. They saw communication structure as the existing pattern of contacts

*Rubenstein's studies were essentially attempts to characterize the effectiveness and efficiency of communication channels. The notion of communication "nets" and communication "systems" are implicit in his approach and methodology.

among individuals. Communication is used mainly as a job tool; it is central to the day-to-day objectives of planning, coordination, and exercise of influence. They concluded that the organizational structure can be conceptualized as communication events that connect pair of individuals. Communication events get patterned and structured. The relationships between people are necessary to study in order to know about organizational structure and communication patterns in an organization.

Burns (1954) empirical studies seem to show that the traditional way of looking at organizational communication as a system of vertical contacts is inadequate. He proposed that communication networks and the executive functions of communication in information distribution, are more useful way of studying organizational structures.

The simplest and most obvious fact about executive communication is revealed by an account of the activities involved. It has been found that executives at work spend 80 percent of their time talking.* Another study reports that a group of top executives spent 70 percent of their time talking.** This brings out an important fact: That written communication simply does not have much of a chance when oral communication demands so much of the executives' time in organizations. This leads to further investigation of the time spent on oral and written communication by lower echelons of management. Further,

*Burns (1954) studied a departmental executive in an English factory.

**Carlson (1951) found this among 12 German top executives. Similar results are shown by Stodgill and Shartle among Navy officers.

oral and written communication can be studied in terms of the nature of work, i.e., technical, administrative, clerical, etc., that individuals perform in organizations.

Simpson's (1959) study shows the impact of technology on communication practices in organization. His conclusion that mechanization affects the direction of communication has opened questions about organizational communication, i.e., that communication flows up or down in direction. As one moves downward in the rank system, the proportion of time spent with peers increases. So, the conclusion one can draw is that in organizations most communication takes place at the horizontal level.

Zajonc and Wolfe's (1963) study raises some crucial questions. In their study of communication by 42 members of an industrial company ranging in position from vice president to clerk to production workers. Zajonc and Wolfe (1963) found that staff employees have wider formal communication contacts than do line employees; within each function, high hierarchical levels have wider communication contacts than low hierarchical levels. As one moves from higher to lower rank, the proportion of initiation of messages increases. Hence, communication initiation is inversely related to rank.

In a field study in three major industrial organizations, Read (1961) found that mobility aspirations among subordinate executives were negatively related to the accuracy of upward communication. Read's study is crucial from the point of view of superior-subordinate work relations. Read further notes that communication failures are commonly listed problems symptomatic of more basic organization,

administrative, interpersonal, or interpersonal problems.

Walton (1962) maintains that "an organization is primarily a communication network dominated by magnetic centers . . . toward which messages are drawn." People who draw messages possess authority, power, expertise, or sociability. The theory suggests that members of the organization initiate contact with these centers in a conscious and unconscious attempt to exert influence.

Summing up, the following points seem relevant: (1) communication as a "job tool," is a useful way of studying organizational communication, (2) organizational structure can be studied in terms of its communicative events, (3) communication explains the behavior of members occupying various positions and ranks in terms of amount, direction, and initiation tendencies, and (4) analyzing communication behavior is a helpful way of identifying the power centers in the organization.

Organization and management studies: Organizational writers often suggest aspects of management which should be given high priority, and through their priorities imply the importance of communication in the organization. Only a few of the large number of organizational writers will be discussed. For convenience, these are placed, sometimes unfairly, in one of four categories (classical structural, neo-classical, individual-centered, and systems or modern). From the population of authors, a set of those who discuss organizational variables relevant to communication were chosen.

1. Classical structural perspective: All of the classical writers excluded social environment from their definition of organi-

zations.* They view organizations as closed, formal, and static system. They focus primarily on aspects of work organization. Taylor (1911), for example, focused his inquiry on the work performance at the lower levels of organizations. To him, task performance depends heavily on strict adherence to plans and routines, and a rigid control system.** Taylor did not emphasize communication in organizations but his emphasis on the structural aspects of an organization indirectly suggest concern for the channel, direction, and content aspects of communication.

Representatives like Barnard (1938), Fayol (1949), Gulick and Urwick (1937), and Mooney and Riley (1939) present a more complex picture of the classical theory. Together, these writers emphasized the need for structural relationships among personnel, production, finance, and other units of the organization. They prescribed a limited use of channels of communication for the purpose of coordination, control, and the uniformity of command.*** Hence, their emphasis is

*The lead seem to have come from Barnard (1838, p. 69).

**Hence, organization was seen as an authority structure characterized by span of control, work specification, and detailed prescriptions for getting the work done.

***Fayol (1930, p. 108) advocated the idea of cross-communication. To him . . . "the need for . . . a channel arises both from the need for safe transmission and from unity of command but it is not always the quickest channel, and in every big enterprise, the state in particular, it is sometimes disastrously long. As however, there are many operations where success depends on rapid execution, we must find means of reconciling respect for the hierarchic channel with the need for quick action." Barnard (1938, p. 9) stated that . . . "the structure, extensiveness, and scope of the organization are almost entirely determined by communication techniques."

on formal, hierarchical, preplanned communication.

This particular view of communication has a philosophical base, which emphasizes that men are made for organizations, rather than organizations for men.* The assumptions of this doctrine are (1) man is rational-economic, (2) his economic needs are most important, (3) man tries to maximize rewards rationally, (4) individuals can be motivated, manipulated, and controlled through economic incentives, and (5) there is an automatic sharing of goals in an organization. The orientation of management is towards the employee, hence leading them to deal only with formal communication channels, and with efficiency or level of production as a dependent variable.

Weber (1927) provides another static view of organizations in his bureaucratic theory.** He stresses the impersonal nature of organizational interactions in dealing with organizational problems which can be solved through staffing and structure. The concept of authority is emphasized. The prescription of rules and procedures makes organizational work move efficiently. In short, it is a monocratic system with a single formal line of command and control. It is characterized by a hierarchy in superior-subordinate relationships in which the

*For a detailed account of the assumptions underlying this doctrine, see Schein (1956, pp. 48-50), and McGregor (1960), who posited these assumptions under his "Theory X."

**It has been said that Weber applied many of the same principles to higher-level organizational members that Taylor had to lower level workers. Weber was concerned with hierarchical aspects of the bureaucratic structure, and the concentration of the means of communication at the top, which makes the position of the top executive impregnable. Thus, information can be manipulated, according to the needs of the situation. See also the more recent works of Etzioni, Gouldner, Blau, and Mouzelis.

person at the top assumes all authority and issues general orders to initiate action. The communication implications of bureaucratic theory are similar to those of previously-mentioned theories, with one exception. That is that where authority aspects of organizations influence communication, the nature of the authority variable is better specified. For example, one might study the degree to which subordinates accept communication from superiors in relation to communication channel dimensions (i.e., overload or speed of transmission).

Summing up, are the relevant points: (1) communication is viewed as a formal restricted system, (2) the purpose of communication is to coordinate various functions, (3) communication is a tool to achieve efficiency, and (4) communication is closely related to structure, particularly authority and control variables.

2. Neo-classical perspective: The neo-structural writers are somewhat more accepting of behavior in organizations. They view organizations as composed of more complex processes than did their predecessors, and they prepared the logical grounds for an open systems views of organizations. While these writers, also see organizations as relatively static, some of them have recognized the environment in which an organization operates.

Simon (1945) lead the group of writers who analyze organizations primarily as decision-making structures. Effective administration can be achieved only through rational decision-making.* For decision-

*Individuals are not capable of making complex decisions, hence, organizations limit the scope of decisions members can make, through prescribing subgoals and members' role in the organizations.

making, organizations prescribe formal rules, channels of communication, and training programs.

Hence, Simon conceptualizes communication as a formal system (called for by the blueprint of the organization) which influences the information-flow for decision-making and effects the achievement of goals in organizations.

March and Simon (1958) and Cyert and March (1963) give specific attention to communication in minimizing uncertainty and risk in the organization.* Communication systems develop channels, various types of contents, and a network of information in order to minimize uncertainty and achieve coordination in the organization.

What emerges from the Simon, March, and Cyert stream of study is the organization as a problem-facing and problem-solving phenomenon.** Administrative management literature of the neo-structuralist approach focuses on structural relationships among production, personnel, supply, and other service units of the organization. Again, like the structuralist's approach, it employs economic efficiency as the ultimate criterion.

*Communication is for the purpose of transmitting, procedural, and operational matters. These matters concern all organizational units which are interdependent. Hence, the task of the communication system is coordination. Coordination standardizes behaviors and absorbs uncertainty. It is the less structural aspects of task that affect communication systems more. To cope with this, networks and channels of communication emerge. The greater the efficiency of the channel, the greater its use.

**Also further studied by March and Cyert (1963); Crozier (1967) studied the problem-solving role of organizations from the point of organizational coping with uncertainty. Crozier starts from the bureaucratic position but focuses on coping with uncertainty as his major topic. See Thompson (1967) and Collins and Guetzkow (1964).

The writings of Woodward (1965, 1970) and the Aston group of Pugh (Pugh, Hickson, Hinings, McDonald, Turner, and Lipton, 1963; Pugh, Hickson, Hinings, and Turner, 1968, 1969; Pugh, Hickson and Hinings, 1969; Hickson, Pugh, and Pheysey, 1969) are consistent with the works of Simon (1945) and March and Simon (1958). The Aston group provides empirical observations of organizations as inter-dependent systems. These authors focus their attention on organizational structural variables (like size, technology, and social function, etc.), but are more accepting of the external environment than their predecessors. The process of communication has not yet been discussed at length by Pugh et al. It is mentioned briefly and in an indirect way in relation with organizational characteristics of centralization, formalization, and configuration.

Similar to the Aston group studies are the works of Udy (1959), Perrow (1970), and Harvey (1968). Perrow's analysis of organizations has three main variables: (1) technology, (2) goals, and (3) environment. These three are independent variables which influence the organizational structure. Technology is the main determinant of structure. Woodward (1965, 1970) thought of technology as the major determinant of structure, but not the only one. Perrow (likewise Woodward) has not discussed communication in detail, but his work suggests a testable hypothesis: Communication within organizations differs from organization to organization, depending on their technologies employed. Within an organization, routineness and non-routineness of the technology determines such organizational structural dimensions as span of control, authority structure, size, etc.,

and hence, the flow, amount, and direction of communication.*

Parsons (1960) suggested a variety of influences that the integration activity in an organization has on communication systems. Parsons' treatment of communication leads us to the next thought of development, namely the individual-oriented perspective.

Summarizing the works of the neo-classical writers, one finds that they view organizations as functionally-specialized, goal-seeking, hierarchical, decision-making systems. These systems in integrating the functions of organization deal with communication variables such as where information flows, what channels are and their use, and the contents of information.

3. Individual-centered perspective: Combining human and structural views into social-technical systems point out the people variables in communication. This is taking a micro view of organizations. Organizational structures are manifested in interpersonal behavior or individuals; organizations are viewed as relatively closed systems and little influenced by the environment. Individuals are seen as possessing various needs that they want to fulfill.

Individuals became the focus of study as a result of the Hawthorne studies (Mayo, 1960; Roethlisberger and Dickson, 1939), and with Lewin's (1951) work on group dynamics. The Hawthorne studies were not specifically a communication research project in industry,

*See Hage, Aiken and Marrett (1971) for an account of the above hypothesis. Also Portor and Lawler's (1964) study the relationships among technology, organizational structure, and communication.

but served as a stimulus to communication research in business.*

An early exponent of this theory was McGregor (1960). McGregor took Maslow's (1954) categories of needs and studied the last three: Social, ego, and self-actualizing needs of individuals. He proposed theory Y, which dealt with the ideas of individuals, the faculty for being creative, attentive, and seeking responsibility and growth.

Argyris (1957, 1960) presents a different view as he sees individuals' needs and those of the formal organizations as being in conflict. The conflict results in frustration, which in turn results in various adaptive mechanisms, like withdrawal, sabotage, and establishing informal interactions in order to achieve goals which the organization does not sanction.**

The individual-centered approach emphasizes that communication is important in motivating members. Sometimes this issue is handled from the point of view of superior-subordinate relationships (Kelley, 1951, Read, 1952), that the lack of trust between them, misunderstanding about their roles, their misperceptions about the meaning of

*It has been argued that communication is an important concern of this set of writers because of their preoccupation with authority, hierarchy, division of labor, the informal system, and interaction among group members.

**Bennis, 1969b; Blake and Mouton, 1964; Schein, 1965; Tannenbaum, 1966; and a number of other writers have developed these general themes with slight variations. The individual's motivation, his achievement, his satisfaction and dissatisfaction are the focus of their studies. Hence, the communication implications seems to be similar. Likert (1967) presents a slightly different view. He thought of an organization as a interlocking system. Communication is an intervening variable, which refers to various kinds of activities in organizations. Communication is key to implementing certain types of organizations.

information that they have, effect the speed and accuracy of information flow in organizations.

Writers in both categories deal with the integration function of communication, information flow, content of messages, channels and networks of communication. These terms are still too broad to suggest specific observations one might make. This leads to the modern or systems perspective, which deals with organizations, individuals, and the environment, and attempts to specify communication variables, in the organizational context.

4. Modern or systems perspective: The writers in this category have taken more interest in the dynamic, changing, and interdependent aspects of organizations. The modern or systems writers view organizations as an interacting and interdependent set of variables. This view is made encompassing, rather than structuralist and individual-centered, which view organization's structure or the individuals only, respectively.

Katz and Kahn, as mentioned previously, offer a system's view of organizations. Their open systems theory integrates the organizational content and small group interactions. Hence, the open systems perspective, appears to be a logical extension of the individual-centered approach. Communication is conceptualized as "information flows in "restricted communication networks" (p. 257). Communication links various subsystems like production, maintenance, adaptive, etc. Communication in Katz and Kahn's open systems perspective is treated in terms of its dynamics, but also in terms of its structural elements (for example, like many network studies).

As mentioned previously, there is a little agreement as to the boundaries of organizations. Hence, it becomes crucial (in order to have a framework for organizational communication) to consider more explicitly the forces external to the organization which influence its behavior.*

Thompson's (1969) views of administrative process are similar to the above-mentioned position of the open systems theorists. To him, organizations have to face uncertainty in the environment. And one way they gear their administrative process is to seal off their core technologies of individuals, from environmental influences. He found bias in reporting events when he looks at the interpersonal level in organizations.** He suggests that communication credibility is associated with information attributed to sources in the external environment, compared to those inside the organization, and that information transmission can be studied in terms of source, accuracy,

*Approaching environment as does Churchman (1968) gives an important view of organizations as open systems. He says if the external factors influence organization's goals and they are beyond control, then the environment is an integral part of an organization's endeavor of its goals and the organization has changing boundaries. This approach fits well with the previously-mentioned approach of Perrow (1970). See also Dill (1958), Evan (1966), and Lawrence and Lorsch (1969), who say that technologies and task environment are primary sources of uncertainty, with which organizations have to deal, in order to manage their environments.

**Thompson (1967, p. 125) reports individual bias at the interpersonal level of organizational communication: "Distortion of organizational records is a widespread phenomenon. Frequently, those receiving reports or records are as aware of discrepancies as those making the reports, and have practiced the same or simpler deceptions themselves. We would expect 'favorable biases' to appear wherever rewards are influenced by records, and alternative ways of reporting are available."

speed, and redundancy.

In summary, the systems or modern view suggests that organizations are aggregates of components needed to accomplish goals; each component generates information requirements. Some of these requirements are met by sources within the organization and some by outside information. One way, then, to view the outer environment is as a universe of information about matters which are beyond the control of organization.

Summary

Summarizing the previously-mentioned set of studies on organizational communication, one point seems clear: Regardless of the particular viewpoint one takes, communication occupies a central place in organizations. There are a number of disciplines which study communication behavior of human beings in the organizational context. Psychologists, studying attitudes, cognition, and perception of individuals, have dealt with communication as a means to induce changes in human behavior. Hence, persuasion and influence aspects of communication have been studied in detail. The communicator's (source) effectiveness in changing behavior depends on his credibility and personality variables. Hence, psychological studies dealing with individuals as they communicate to influence others has relevance to organizational communication.

Sociologists have studied communication behavior of individuals as they relate themselves with a larger group. These studies have relevance for organizations as they present a view of communication

behavior in the social context. Also, these studies have provided a way of predicting communication behavior from an individual's social contacts, his professional group membership, and other important groups that influence his behavior. Mass media studies have created a greater awareness among communication scientists of the importance of channels in the process of communication, and the type of influence that various channels have on the receiver. The famous two-step flow (compared to a one-step flow) as studied by sociologists, provides a useful way of studying feedback and effectiveness in organizations.

Another set of studies which deal with networks of communication provide a scheme to study communication behavior of individuals in the context of organizations, but focusing on regularized or patterned information-exchange behaviors. The individual's position in the hierarchy, his personality, his place in the power structure, his associations with superiors, etc., seem to influence the amount, direction, and contents of communication that he receives or seeks. Also, the size of the unit, distance among the members, and locale, seem to effect communication behaviors.

Rumor or grapevine communication offers a picture of communication behavior that individuals develop (within the formal setting) informally. Rumors are unofficial information with high interest value, and are disseminated from person-to-person within organizations. Rumors exist in organizations and are very similar to non-rumor communication.

There are some operational studies of communication conducted in on-going organizations. Communication is studied as an essential

job too which individuals use and need in organizations. The nature and needs of the task determine to some extent, the communication behavior of members at various levels in the organization.

Finally, there are management organization studies which offer a picture of communication as it has evolved along with the theory of organization. In the classical or structural school, communication was studied in relation to the structure of organizations. Communication in authority exercise, job description, control, and coordination played an important role. Neo-classicists or neo-structuralist deal with the role of communication in the process of decision-making. They view organizations as goal-seeking, hierarchical, specialized systems which use communication in terms of information flows, channels, and contents of information. The individual-centered approach deals with communication in individuals' interpersonal contacts. Individuals have a tendency to withdraw from communicating, misperceive the meaning of communication, effect the speed and accuracy of information flow in the organization, as an indication of their resolution of the conflict of personal with organizational goals. Finally, the modern or systems approach offers a way of studying communication in relation to many other variables, interacting simultaneously. Communication is dependent on the environmental changes that the organizations cannot affect or control.

Following are some of the most relevant points, which various studies contribute in varying degrees, about the understanding of organizational communication: (1) organizational structure as they interact with their changing environments, need to be studied in terms of

communication events, (2) communication, like decision-making, control, planning, and evaluation, is essentially a process which has components--source, message, channels, and receiver--and serves the function of coordination and direction of efforts--i.e., goal achievement through maximization of efficiency, and (3) the individual's personality, social environment, and various group belongingness, influence his communication in organization, but the nature of influence varies from situation to situation.

CHAPTER IV

TECHNOLOGY AND COMMUNICATION IN ORGANIZATION

The purpose of this chapter is to relate technology to communication behavior in organizations. Technology and communication are interdependent and co-determine each other. Since in the available literature, there are no studies relating technology to communication, the present chapter draws implications from various studies to set the context of the present study. In the chapter, technology (1) is defined, (2) its importance is discussed, (3) important studies relevant to technology and communication are discussed, and (4) finally, a scheme for studying technology and communication is prepared.

Technology Defined

Technology is defined as those "actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make changes in that object. The object, or 'raw material,' may be a living being, human or otherwise, a symbol or an inanimate object" (Perrow, 1967, p. 195).*

*In simple words, technology is a plan or design by which work is done in organizations. It involves methods and techniques (both technical and administrative, etc.), to produce goods and services. Ellul calls technology a technique. Technology is far more than just the machine and refers to standardized means for attaining a pre-determined objective or result. Thus, technology converts spontaneous and unreflective behavior that is deliberate and rationalized. "In our technological society, technique is the totality of methods rationally

Technology means knowledge about the performance of certain tasks or activities. To Ellul (1964), technology is technique. By organizational technology is meant the techniques in the transformation of inputs into outputs. This indicates that technology includes machine and other human technologies. Hence, organizations deal with mechanical and nonmechanical technologies. For example, the accountant may use computers in his task, but he also uses technology based upon his knowledge of accounting procedures. It is evident that there is an interaction between the machine aspects of technology, and specialized non-machine technology.

The word "technology" may have various meanings to various people. As is indicated by the above, conceptualization of an organization's technology is still at a stage where one widely-accepted definition is used. One attempt to define technology in terms of its three facets is that of Hickson, Pugh, and Pheysey (1969). They say that technology has three facets: Operations, materials, and knowledge. These three, taken together, encompass the range of meanings.

The concept of operations technology to Pugh et al is all "techniques that use in its workflow activities" (1963: 310). Thompson and Bates (1957), Udy (1959), Woodward (1958, 1965), and Burrack (1966, 1967) all operationalized technology in a like view. They take all non-machine activities together toward the achievement of a desired good or service, as technology. The concept, however,

arrived at and having absolute efficiency (for a given stage of development) in every field of human activity" (Ellul, 1964, p. 25).

may be defined as providing and serializing activities in the workflow. Bakke (1959) defined workflow as an activity of production and distribution of output. Used in a wide sense, all kinds of business, factories, public utilities, transportation businesses, insurance offices, etc., employ technology of some kind.

The concept of material technology is mainly a development of Perrow's (1967) theoretical scheme. To him, technology is "the actions that an individual performs upon an object . . . in order to make some change in that object" (1967: 195). This includes the characteristics of the object itself, or raw material.

The concept of "knowledge technology" is also an idea developed mainly by Perrow (1967). Perrow (1967) and Thompson (1967) define knowledge technology as the characteristics of the knowledge used in the workflow.*

How far does technology determine the form taken by the structure of an organization? Technology has come to be considered an important determinant of organizational structure and functioning. Comparative empirical studies of its effects on structures are few, mainly case studies on the effects on the operator's job and attitudes (Walker, 1962). Thompson and Bates (1957) compared the technologies of a hypothetical hospital, university, factory, and mine, and postulated "that the type of technology available . . . sets limits on the types of structures appropriate for organizations."

*So technology to them is "the sequence of physical techniques used upon the workflow of the organization; even if the physical techniques involve only pen, ink, and paper. The concept covers both the pattern of operations and the equipment used" (Pugh, Hickson, Hinings and Turner, 1969).

The lack of empirical research is indicated by the fact that Walker's (1962) substantial collection of readings related to technology included only one study done by Scott et al (1956) in a steel plant, which made reference to organizational variables. This study had shown that as there was an increase in the number of specialist service departments and the need for more formal communication channels as technology was more mechanized. Burrak and Cassell's (1967) study indicated a relationship between organizational growth and technology. So did the studies by Fershaw and Hooper (1964) and Burl's and Stalker (1961).

Two pieces of research stand^Yout in their endeavor to explore and classify technology in relation to organizational structure. They are controversial studies, one by Udy (1959) on work units in nonindustrial societies, and the other by Woodward (1958) on a variety of firms in Southeastern England. Both studies have been criticized for their comparison of noncomparable production units (Burns, 1967) and for ill-defined concepts and inadequate data-analysis (Hopkins, 1966), respectively. Yet as Hickson et al (1969) point out, both of the above-mentioned studies were pioneering works.

Importance of Technology

The importance of technology as a determinant of organizational structure still remains a very debatable, and not very well-established, issue. Writers of classical management theory like Fayol (1949), Urwick (1947), Brech (1957), Drucker (1955), Koontz and O'Donnell (1968), have proposed principles of management which would be applicable irrespective of task and technology. Brown (1960) and Dubin (1958) in the late 1950s

and early 1960s drew much attention to the issue of technology as a major determinant of organizational structure. Perrow (1967) suggested that when organizations are viewed as technological systems, they offer better way of understanding to observers. Walker (1962) went to the extent of saying that it was technical complexity which lead the historical line organization to move to line and staff structure. Woodward (1958) regarded technology as the independent variable and organization structure as dependent variable.

Relevant Studies Implying Relationships Between Technology and Communication

There seem to be no studies which correlate technology and communication specifically, at present. The relationship between communication and technology can be implied from organizational structural studies.* Hence, for our present study, a critical review of literature which implies a technology and communication relationship becomes necessary. The present review of literature is categorized as: (1) technology and structure; (2) technology and individuals, (3) technology and social relations in the organization.

*See Kast and Rosenzweig (1970, pp. 150-159), who study the impact of technology upon organizational structure, the psycho-social system, and the managerial system. Implications for a relationship between communication and technology can be drawn from their discussion. Also Burns and Stalker (1961) in their discussion of organic and mechanic organizations, do not deal with mechanisms of the communication process, but do deal with the nature of communication such as consultation and command, in organic, and mechanic systems, respectively. Also Woodward (1965, 1968) and Perrow (1967, 1970) mention communication and technology, but not directly and at length.

Technology and Structure

The broad hypothesis that technology and structure are related holds true.* A number of studies have focused on this aspect. Woodward (1965) divided 100 industrial firms in Great Britain, based on their technology of production, as: Small batch or unit, assembly line or mass production, and the process industries. Table 4-1 shows her classification, and what are some communication implications of her study. She found (1) there is no significant relationship between technological mode and organizational size; (2) the number of levels of authority increased with increasing complexity of technology: (3) the ratio of managers and supervisors to total personnel increased with technical complexity (it should be noted that the last two relationships held with size controlled), and (4) it necessary to incorporate Burn's (1961) distinction of "organic" and "mechanistic" management systems in her research.** The important finding was that there tended to be an optimal structure for each type of technology.***

*See Hickson, Pugh, and Pheysen (1969) and Mohr (1971). But also it is important to note that the relationship is a diffused one and it always takes second place to other structural variables (see Pugh et al (1969a). Also, see Hage and Aiken (1969).

**In Burn's general terminology, the "organic system," is characterized by a less formal definition of jobs, flexibility, and communication along the hierarchy tending more to take the form of consultations rather than command. Whereas the "mechanistic system" adheres to rigid rules and specific jobs. It also has a well developed command hierarchy along which communication takes the form of commands.

***The fact that organizational characteristics, technology, and success were linked together in this way suggested that not only was the system of production an important variable in the determination of organizational structure, but also that one particular form of organization was most appropriate to each system of production" (Woodward, 1965, pp. 69-70).

Table 4-1. Woodward's Classification of Organizations Based on Their Production System and Their Communication Behavior and Systems.

Classification of Organizations	Level of Technology		
	Small Batch or Unit Production	Mass Production	Continuous Process Production
Illustrations	Made-to-order items, equipment, machines, furniture, etc.	Textile, assembly line, etc.	Chemical, oils, pharmaceuticals
Structural Dimensions	Length of the line of command, span of control, the ratio of managers to total personnel	Length of the line of command, span of control, the ratio of managers to total personnel	Length of the line of command, span of control, the ratio of managers to total personnel
Communication Implications	Communication patterns incorporated in the design of tasks; communication behavior is easily predictable; not much effort to seek information	Communication is independent of tasks; communication patterns evolve out of task and work flow; not very predictable; more effort to seek information	Technology is interdependent; hence communication is also interdependent, but at the same time evolves out of task; communication not so easily predictable; seeking of information is common

There is a growing consensus that the organizations with stable operations need structures different from those with a changing technology.* Bureaucracy is said to be an ideal structure for stable operations, but as Thompson (1965, p. 1) suggests, changing technology and innovation require substantial structural changes:

*See Lorsch (1965), Burrack and Cassell (1967), and Hall (1962), for a discussion suggesting the distinction between types of structures appropriate for stable, as compared to innovative, technology.

Suggestions are made for alterations in bureaucratic structure to increase innovativeness, such as increased professionalization, a looser and more untidy structure, decentralization, freer communications, project organization when possible, rotation of assignments, greater reliance on group processes, attempts at continual restructuring, modification of the incentive system, and changes in many management practices.

The above implies that communication systems in stable and innovative systems are somewhat different too. In the stable organization, communication is formal, more vertical, about job, and comes via the chain of command. Whereas in an innovative system, communication may be more informal, horizontal, contents may be diffused, and there is openness among communicants. As Jasinki (1959, p. 86) also points out, the changing technology requires emphasis upon horizontal and diagonal relationships rather than upon vertical hierarchy.

Perrow (1967, 1970) suggests that the structure and technology are related. The interest in technology as an independent variable stems from the recognition that the work processes of an organization provide the foundation upon which social structure is built (Perrow, 1967: 195). Because of this, technology should influence the nature of that structure. That is, technology is likely to determine whether it is formalized or nonformalized, whether it has a diverse or relatively simple division of labor, and so together the technological foundation and substructural social arrangements influence the substructure of organizational goals.

As technology is routinized, the organization is coordinated via programming. This is likely to be accompanied by a centralization of power, formalization of roles, and some lessening of the level of professionalization in the organization. Similarly, organizations with

routine work structures are likely to emphasize the quantity of client services rather than the quality of those services. Routine organization is likely to be concerned with stability and high profits achieved via quantity of production and an avoidance of innovation. In contrast, the non-routine organization will emphasize growth, quality, and innovation, being less concerned with making profits.

Thus, the routine technology may result in centralized and formal communication systems. The direction of communication may be more vertical with low provision for feedback, and the contents of communication, as one may guess, would not be as varied.* Efficiency in the communication system is most emphasized.

Technology and Individuals

The technological explanation of human behavior (especially communication) is offered by studies done on worker productivity, morale, job satisfaction, and leadership behaviors in organizations.** These studies offer a base for later studies which indicated that the style of supervision has an impact upon the general behavior of subordinates and their communication behaviors with peers, superiors, and subordinates.

*It has been found that informal communication systems are natural phenomenon in organizations. Hence, in routine or stable technology organizations, informal communication systems emerge to fulfill some of the individual's needs and requirements. The efficiency of formal systems may also result in efficient informal communication systems; see Davis (1953b).

**Studies by French, Israel, and Aas (1960), Lewin, Lippitt, and Scalona (1953) are important. These studies have implications for studying the role of technology and social relationships in determining the role of communication in organizations.

Managerial styles* and manager's assumption about people** determine morale, productivity, and satisfaction on the job,*** but do not show any significant correlation between leadership and morale; hence, little could be predicted about the communication behavior of the individual.**** A study on an assembly line indicates that supervisory behavior is interpreted in terms of communication response. Goldthrope (1966) indicates that while 94 percent of the sample of Luton car workers said they got on well with their foreman, 65 percent of these gave an explanation in terms of their infrequency of contact (interpersonal), and only 26 percent gave reasons which referred to more positive form of supervisory behavior. Hence, the implication is that communication is related to technology as well as to some extent to the supervision provided on jobs.

Another important study (Blauner, 1964) offer some implications for the study of communication as dependent on the technology of an organization. Blauner (1964), from his work on assembly line workers, found that various technologies have relative alienating capacities. The "alienation" here can be interpreted as communication alienation, that is a relatively low degree of communication transactions and less

*See Adorno et al (1950), Lewin, Lippitt, and White (1959) and Likert (1960, 1968).

**See Schein (1965, chapters 4 and 5).

***Fleishman, Morris, and Burt (1955), and Mann (1957).

****This lead to the realization that the relationship between leadership, productivity, and morale were only valid under certain conditions. For example, the personality distribution of the group (Golembiews, 1962) and the type of job (Likert, 1960, 1965) determine the leadership style and amount of supervision. For example, when a majority of the group members were authoriian-type, or whose task was respective and routinized, direct supervision was more effective.

frequent contacts (usually characteristic of formal communication systems which routinize jobs, hence resulting in high bureaucratization), and "involvement" can be meant to indicate communication involvement, that is a higher number of messages interchanged and high frequency and duration of contacts (usually characteristic of informal communication systems which have a lesser degree of routinization resulting in low bureaucratization).*

As communication is affected by technology, it becomes a more encompassing one. It deals with (1) social variables, which imply communication interactions, (2) as they are related to, and interdependent on, technology, (3) and are influenced to some extent by supervisory behavior, and the nature of task, (4) as they mediate the process of input-transformation-output in organizations.

Technology and Social Relations in Organizations

The technological explanation of communication is offered by the group of studies** that come under the category of social structure

*Silverman (1970) puts Blauner's position in a very vivid manner: Accepting that modern technology itself, rather than social relations of production within a capitalist economy, is the "cause" of alienation, Blauner hypothesizes that some technologies are more alienating than others. To simplify, he argues that work in craft industries is most satisfying, in assembly line production least satisfying, while process technologies fall somewhere between the two" (1970).

**Following are some of the more representative exponents of the theory of social systems: Foote (1959), Sayles (1958), Homans (1950), and Selznick (1949). The group of social scientists (associated with the Tavistock Institute of Human Relations in London) like Emery and Trist (1960), Rice (1963), Burns and Stalker (1961), Lawrence and Lorsch (1967), and Woodward (1965) get credit for the development of the concept of sociotechnical system.

Woodward and Trist deal with the demands which technology and the social ties of the participants make upon organizations. Other socio-

studies of organizations. The central thesis of this system is that organizational behavior is governed not only by social needs but also by variations in technological and social relations.

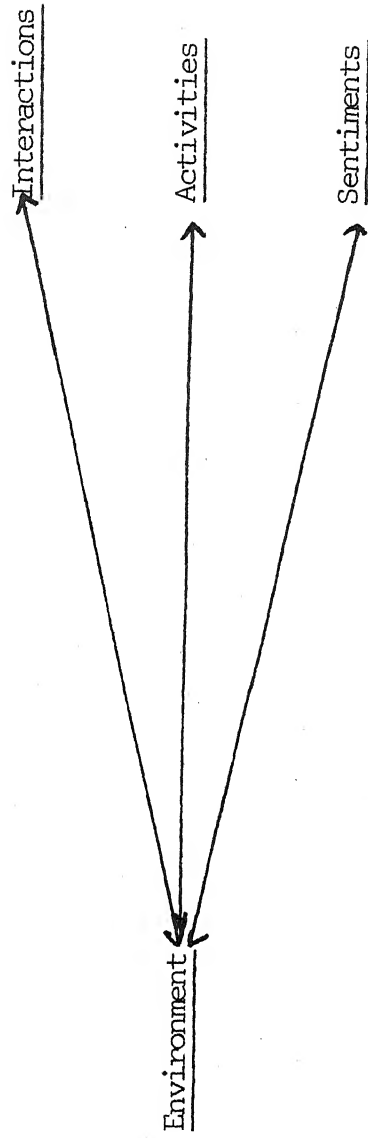
The first group of studies deal with the environment of organizations as consisting of interactions, activities, and sentiments. Figure 4-5 explains that the socio-system of the organization consists of technology, the formal structure, and the sentiments of the members, intertwined with each other and with the environment in which the organization is located.* These influence and co-determine each other and are influenced by the environment, which includes technology.**

Parsons (1960, pp. 60-96) provides a useful framework to study the social systems of organizations in three managerial levels in the hierarchical structure of complex organization: The technical or production level, the organizational level, and the institutional or community level (Figure 4-6).

technical theorists have concentrated on the ways in which the characteristics of an organization environment shape what would be the most appropriate organizational structure (Burns and Stalker, 1961; Emery, 1965).

*Here it is important to note that the human relations schools' attempts to understand the factors affecting job satisfaction have taken the work group as the primary concern. They believe that work is the most important activity to satisfy the social needs of man and to resolve the crisis of integration. They focus on the work-group and deemphasize the formal structure of the organization. The crucial thing here is to recognize the fact that it is not one or the other factors which shape the structure of the organization. Rather it is a combination of various factors, in various degrees, which govern organizational behavior.

**Homans (1950) presents a view of organizational environment in terms of external and internal social system, which refer to the formal communication system, and the informal communication system, respectively.



Environment: Includes technology.

Interactions: Occur between members in the performance of tasks.

Activities: Are tasks which people perform.

Sentiments: Develop between people.

Figure 4-5. Socio-Technical System.

Type of Manager	Task	Viewpoint	Technique	Time Horizon	Decision-Making Strategy
Technical	Technical Rationality	Engineering	Scientific Management O.R.	Short Run	Computational
Organizational	Coordination	Political	Mediation	Short run and long run	Compromise
Institutional	Deal with uncertainty; relate the organization to its environment	Conceptual and philosophical	Opportunistic surveillance; negotiate with environment	Long run	Judgmental

Figure 4-6. The Managerial System: Technical, Organizational, and Institutional Levels.
Adapted from Petit (1967, p. 349).

Technology for Blauner* is seen as a central determinant of behavior, as he himself points out: "That the worker's relation to the technological organization of the work process and in the social organization of the factory determines whether or not he characteristically experiences in that work a sense of control rather than domination. . . ." (1964, p. 7).

Summing up, technology as an explanation of social behavior (i.e., communication) deals with (1) interrelated variables in their external or internal organizational context, (2) in reaction to their tasks in the production process involving techniques, (3) employed by individuals.

Hence, in the final analysis, the three categories of studies seem to derive their general framework from the classical school of organization, but they differ on underlying principles. At the same time they incorporate both the individual and social environment and the needs-centered emphasis of organizational psychologists, and the structural-functional emphasis of organizational sociologists. Hence, they together provide an explanation of communication based on technology, people, their social behaviors, and organizational goals, which managers bring in co-alignment, in the face of changing environment and task of coping with uncertainties and managing ambiguities.

*Silverman (1970) and others have called this attitude of technology as being a central determinant of behavior, as "technological determinism," and advocates of this view as "technological determinists." Joan Woodward (1965, 1968) and Charles Perrow (1964, 1965, 1968, 1969, 1970) are also said to have proposed the technological determinism view, but in various degrees.

Summing up, the following points seem important: (1) technology is based upon the tasks to be performed, (2) the social subsystem (i.e., communication) is the relationship between participants; (3) the technological and social subsystems are interdependent, and (4) technical systems mediate in the process of input-transformation-output, as shown in Figure 4-7.

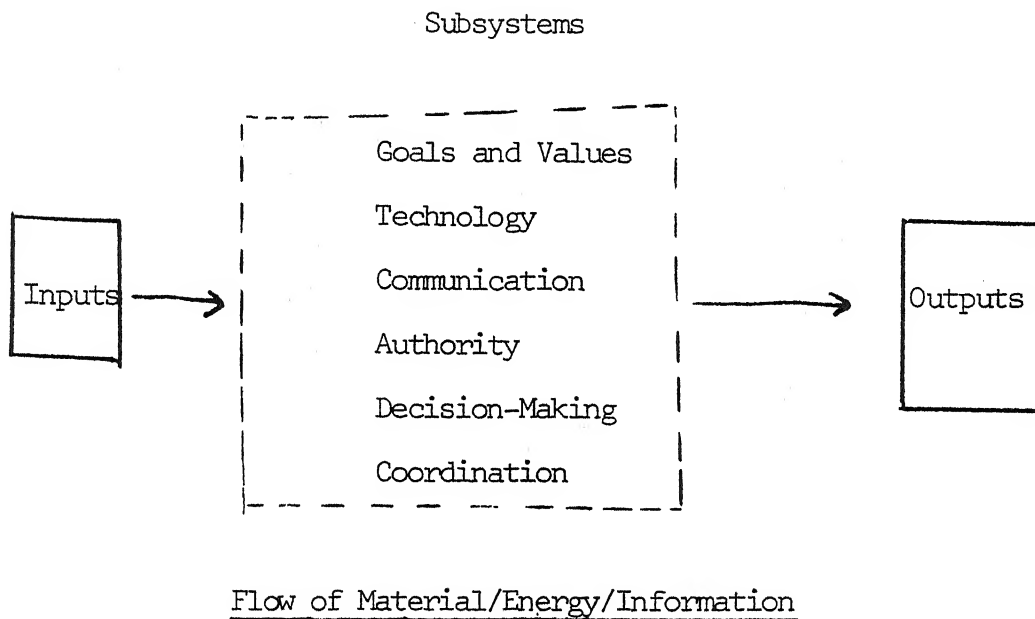


Figure 4-7. Organization as a Socio-Technical System.

Communication and Technology

As it has been previously mentioned that organizational structure is viewed here in terms of its communication system.* Hence,

*As Dorsey (1959, p. 315) puts it: "The fact that communication is the process by which a [social] system establishes, and through which it continues its existence, reinforces the . . . suggestion that more complex social systems can be defined in terms of communication." Hence,

communication is studied as it is influenced by the technology, in the actual production process, procuring materials (inputs) for maintaining the organization, and for coordinating the three phases of input-transformation-output. Consequently, assumptions can be made that organizations attempt to synchronize their communication systems with their technology. A proper accommodation to each other seems to be the prerequisite for efficient achievement of the organizational goal.*

Technology as an explanation not only of output produced, but of communication, identifies the following variables which are influenced by the technological system:

- (1) The interacting entities (people in various positions involved in the production process, who are communicating).
- (2) Their interacting events and initiation and sources of interaction, etc.
- (3) Their amount of interactions (in terms of frequency and duration).

organizations can be defined in terms of their communication systems as they can be defined as decision-making systems, proposed by Simon (1958). Organizations, whether viewed as communication and/or decision-making system, depend upon some kind of administrative form for directing, and coordinating the activities. Bureaucracy is the administrative form which organizations have in varying degrees.

*Deutsch (1952, pp. 367-368) pointed out that probably it is the organization structure (i.e., communication) that follows the technology, rather than vice versa. The effects of technology on communication structure are important but not the sole determinant factor, as Woodward (1968) pointed out: "It is important to emphasize that the approach is not technological determinism. It is not suggested that technology is the only, or even the main, determinant of organizational behavior. All that is implied is that technological differences, that is differences between the nature of the tasks undertaken in organization, provide a better basis for comparing organizational behavior."

- (4) The functions that the communication messages perform (related to getting the work done, encouraging the need for innovativeness in the job, and change orientation).
- (5) Their mode of interaction (written or oral, and method used at different levels compared to other levels).

Mouzelis (1967, p. 196) summarizes that technology is a definite impact on communication in the organization.* He does this by enumerating how communication methods, amount, source, contents, etc. are dictated by needs of work flow requirements:

The determining role of the technological structure and process on the patterns of interaction becomes evident. The sequence, frequency, and duration of interactions depend in great fact on the work flow, on the way materials are processed from one workpost to the other in time. Thus, we have come back to Taylor, to the examination of the physical and technological context in which interactions take place. The difference, of course, is that the interactionist flow charts emphasize those aspects of the work process which involve and are relevant to contact among people.

SUMMARY

Summarizing technology and communication, the following points emerge: (1) technology and communication are interdependent and co-determine each other, (2) organization structure, social systems, and individual's personality and psychological processes, influence and determine communication behavior in organizations.

*Another way of looking at the impact of technology on communication is from the strategy of change that organizations use. Chapple (1940, 1961) found that to change workers' attitudes it is not only necessary to train supervisors in human behavior dynamics but it is also important to change technological and communication structure of the organization. Chapple's analysis seems to be pointing at what Whyte (1959) and Sayles (1958) discussed as the interrelatedness of formal and informal structure. In his four different workgroup typologies based on level of skill and degree of interpersonal interaction (communication), Sayles seems to point out that the technology of the plant molds the type of workgroup that evolves. And the human element is a resultant of the technological decisions, and in part, at least, predictable from them.

CHAPTER V

ANALYSIS OF THE ARC ORGANIZATION: A CASE STUDY

The purpose of this chapter is to present an analytical picture of the organization studied. The organizational structure, authority, and power relationships, work flow contacts, and other interpersonal behaviors are analyzed. Technology influences on the communication system is further emphasized. The chapter begins with a discussion of (1) the ARC organization's structure and work environment, (2) a detailed analyses of the technical and communication variables, (3) a detailed analysis of the sample characteristics, (4) methods of data-collection, and (5) measurement of the data.

Introduction to the Organization

The organization studied is a government of India concern, established with foreign collaboration in the state of Uttar Pradesh. It was founded with the main object of promoting the design and manufacture of some of the more complicated and sophisticated steel structures, namely, initiating structures, high tension towers, bridge structures, pressure vessels and apparatus, pen-stocks, storage tanks, and other plate-structures including blast furnaces, popola-furnaces, L.D. vessels, convertors, hydraulic structures, crane-construction including E.O.T. cranes and mechanical equipment, etc. The plant has been designed for an annual production of 25,000 tons of steel

production of 2,147 tons during the year 1968-69 against a target of 5,000 tons. In the matter of production the company is reported to have reached at present less than one fourth of its rated-capacity, with an employment of about 1,500 employees (its designed level of labor employment is 2,400). Management felt that the situation in this regard would improve with the installation of additional machinery and recruitment of workers, which were going on at the time of the study.

The organizational division of members is elaborate. There are about 19 categories in which the members fall; from lowest to top, they are:

- (1) Unskilled workers
- (2) Semi-skilled workers
- (3) Skilled workers, grade III
- (4) Skilled workers, grade II typists
- (5) Skilled workers, grade I
- (6) High skilled workers
- (7) Steno-typists/storekeeper, etc.
- (8) Group leader, grade II/senior stenographer/junior assistant
- (9) Group leader, grade I/personnel assistant/assistant
- (10) Supervisor, grade II/senior assistants/senior accountants/private secretary/draftsman engineering
- (11) Supervisor, grade I
- (12) Assistant officer/assistant engineer
- (13) Sentional head/design engineer/foreman, grade I
- (14) Senior engineer/senior officer
- (15) Departmental head/personnel manager/superintendent of training

- (16) Deputy chief engineer/financial manager/secretary-cum-administrative officer
- (17) Chief engineer
- (18) General manager
- (19) Managing director

We selected the members in the last 12 categories for our study.

Structure (As Explained by the Chart)

The company is managed by a board of eight directors, including the chairman. Four of the directors, including the chairman and the managing director, are nominated by the government of India, and the remaining four by foreign collaborators. All policy is decided by the Board. The Managing Director is, however, responsible for the day-to-day affairs of the company and is overall in charge of administration. At the time of the study, the post of the Managing Director was vacant as the previous Managing Director had resigned.

The business of the concern is being carried out by four departments, namely: (1) production, (2) commercial, (3) administration, and (4) finance. Each of these four are headed by a top official with the rank of general manager. In the organization at the time of the study, the production and commercial heads were given the title of General Manager.

The financial officer is the senior-most head (although not called general manager), he described his actual job to be that of general manager. In the administration departments, the head was known as Secretary-cum-Administrative Officer; he also did not have the title of general manager.

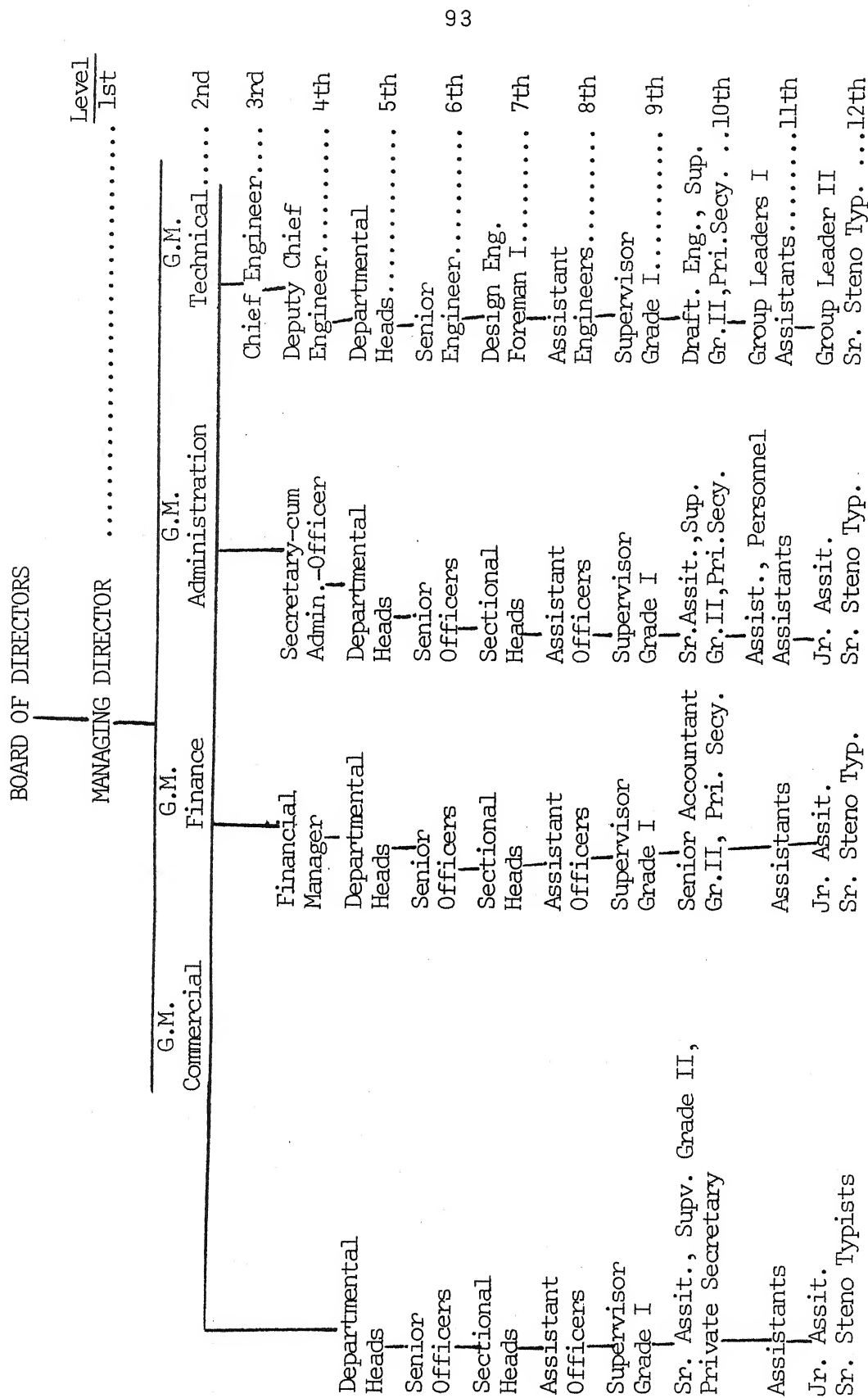


Figure 5-10. Organizational Chart of the ARC Company, Showing Hierarchical Levels.

GENERAL MANAGER

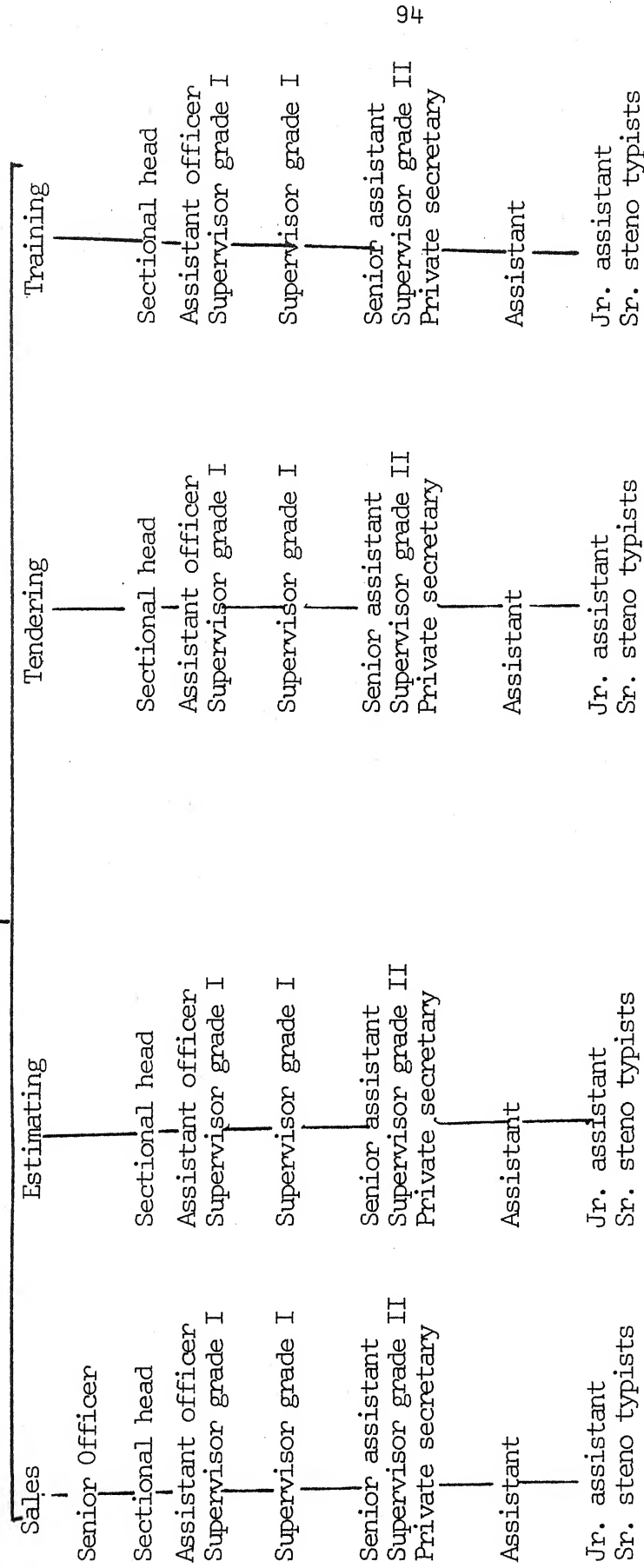


Figure 5-11. The Organizational Chart for the Commercial Department.

GENERAL MANAGER

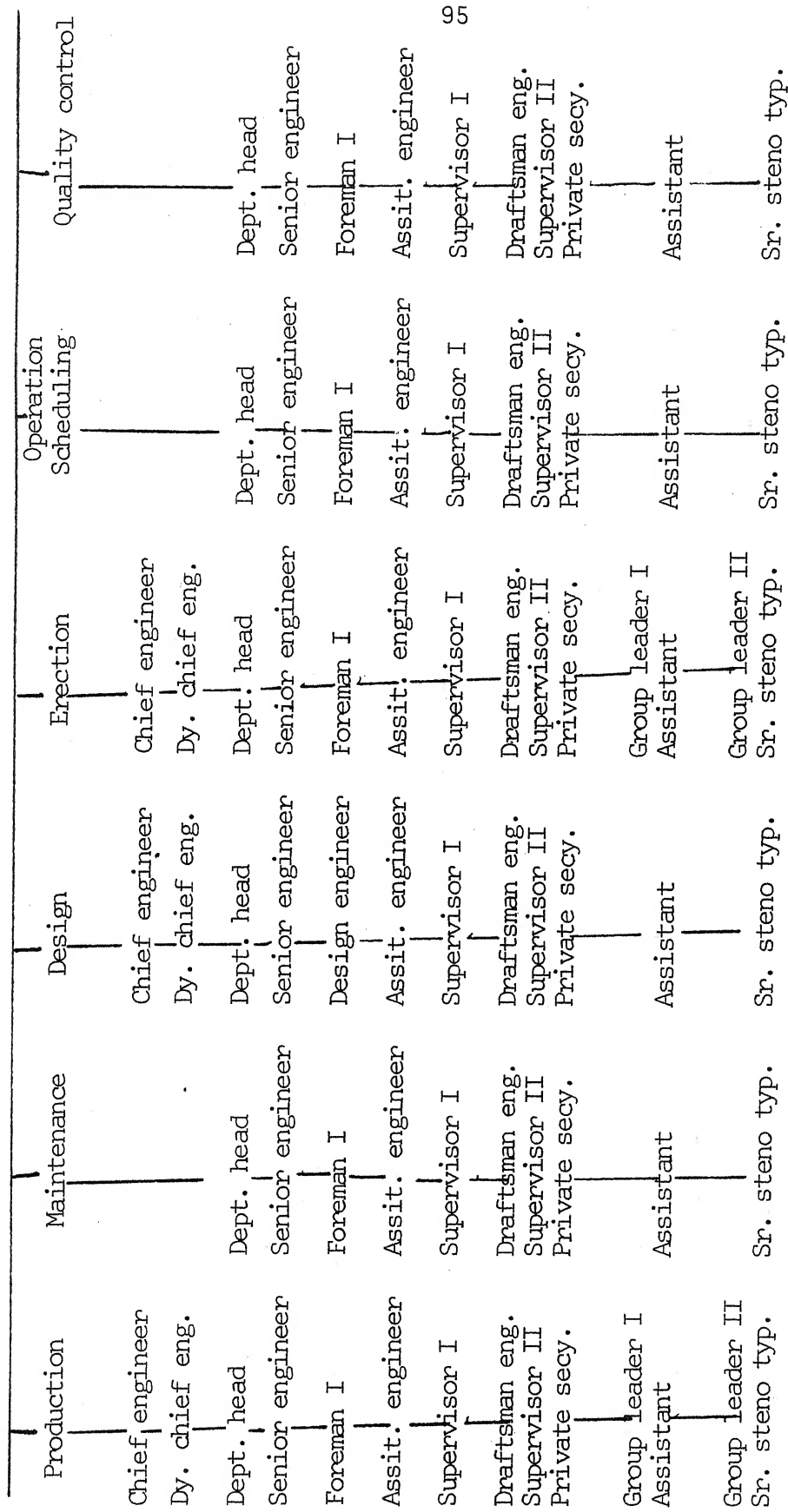


Figure 5-12. The Organization Chart for the Production Department.

GENERAL MANAGER

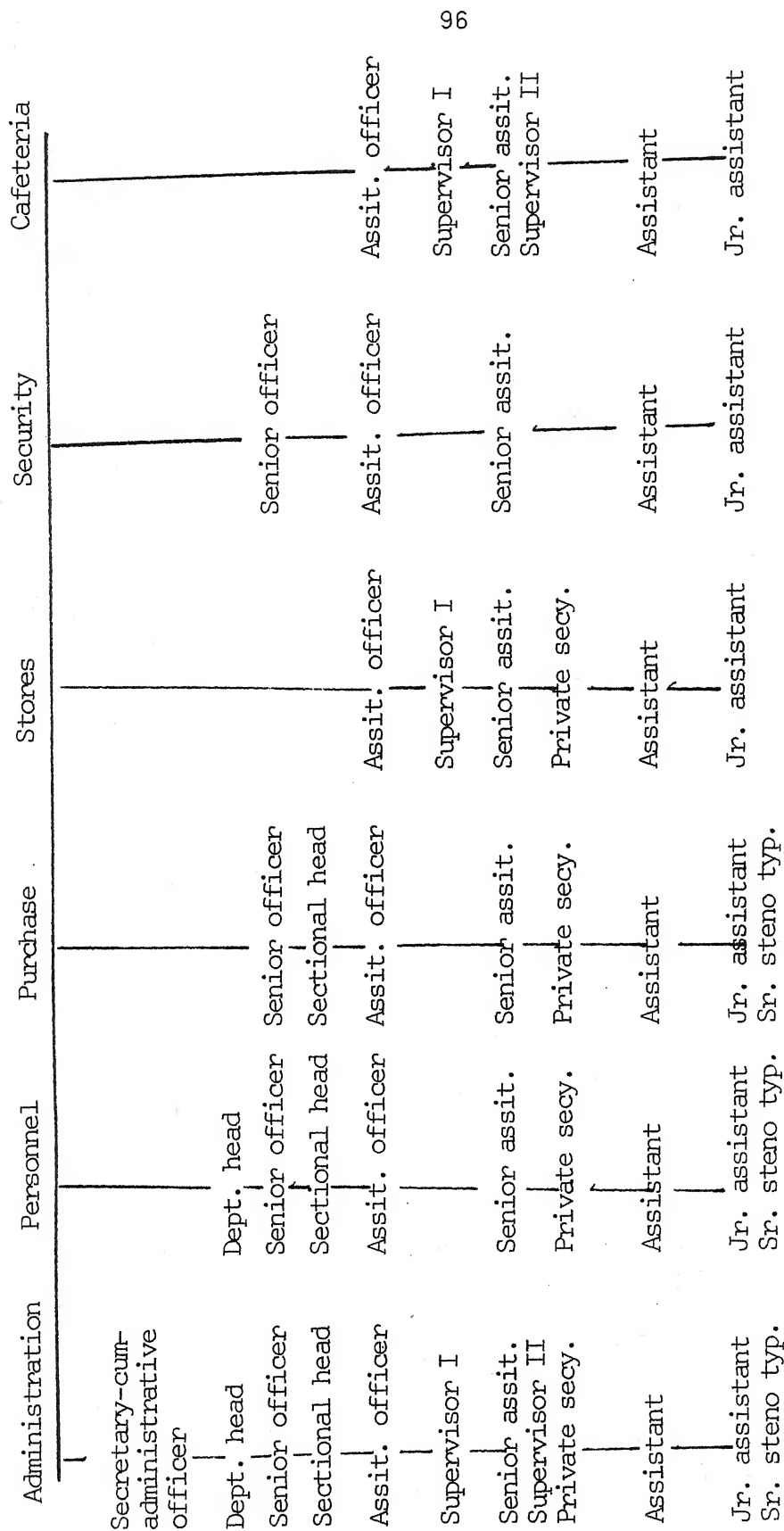


Figure 5-13. The Organization Chart for the Administration Department.

GENERAL MANAGER

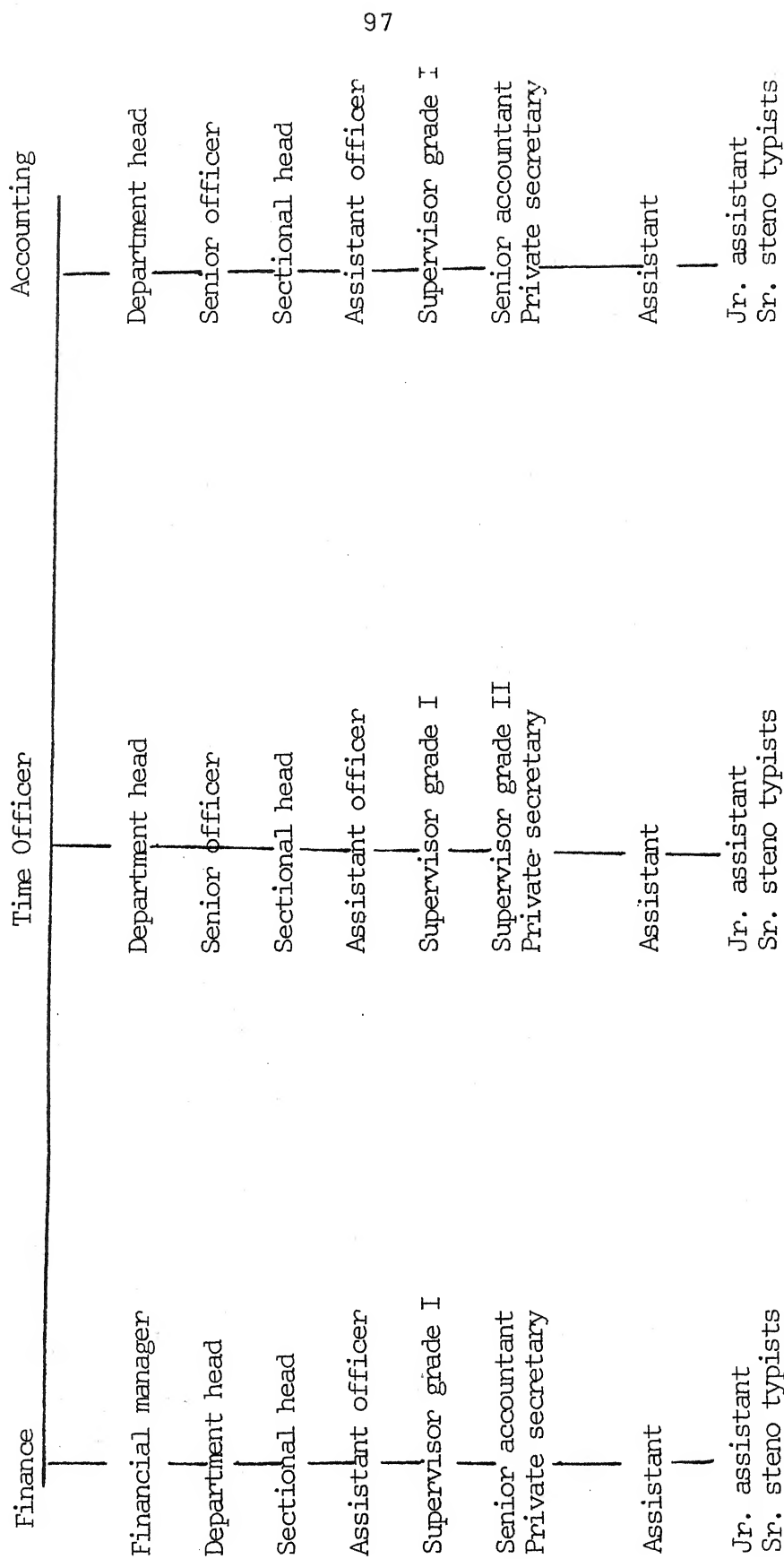


Figure 5-14. The Organization Chart for the Finance Department.

There were various divisions and subdivisions under each of these four departments. Under the Commercial Department comes: Public relations, sales, future sales estimates, material procurement, etc. The Production Department is concerned with design, material-handling, operation-scheduling, layout of the design, etc. The Department of Administration deals with personnel, safety, auxiliary workshop, etc. The Finance Department deals with budgeting, cost control, and accounting in the organization.

Structure As Actually Observed

In actuality, the organization chart was not very useful. The actual structure of the organization seems to be different from Department to Department. The Production Department has the largest number of employees, for obvious reasons. Consequently the hierarchy was also characterized by many more levels, compared to the other three departments. The Commercial and Administration Departments' actual structure came closest to the organization chart. The Administration Department did not have a person with the designation of General Manager. Hence, its hierarchy begins with the Secretary-cum-Administrative Officer as the top official, and comes down to the Junior Assistant level. The hierarchy of the Finance Department presents a flatter structure and also it does not begin at the general manager level. At the time of the study, the Finance Manager was the top official.*

*On the whole, the organization looked very much like Figure 5-15. It did not have a traditional format of starting from top toward the bottom. Rather, it shows a circular form which indicates that among various departmental units exists very little contact. It was difficult

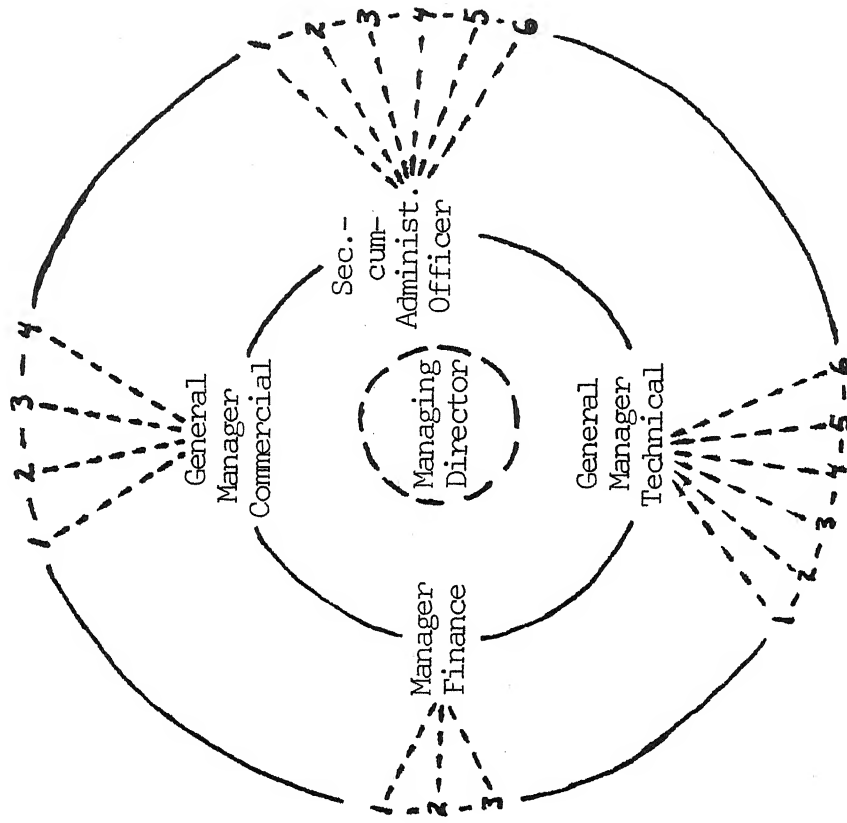


Figure 5-15. Organizational Circle Chart of the Company's Operation.

Key:

Commercial Division	
1.	Sales
2.	Estimating
3.	Tendering
4.	Training Center

Technical Division	
1.	Production
2.	Maintenance
3.	Operation Scheduling
4.	Erection
5.	Designs
6.	Inspection and Quality Control

Administrative Division	
1.	Administration
2.	Personnel
3.	Purchase
4.	Stores
5.	Security
6.	Canteen

Finance Division	
1.	Finance
2.	Time Office
3.	Machine accounting

This organization like most of the public bureaucracies employs a considerable number of public servants organized in a certain way to carry out a number of coordinated activities. As Kaufman (1954) suggests, here too, we found evidence that every sort of work, every type of skill, every level of technical specialization, and every profession were represented. There are members from every geographic region of India, and almost every working age group was represented. The turnover rate throughout the organization was high, so the personnel kept changing.

This organization's pronounced characteristic is growing a imbalance between technical specialists and the incumbents of hierarchical positions (Thompson, 1965). This tension is to some extent mediated by reliance on human skills or leadership, which is provided by appointing technical as well as non-technical people at key line positions. The necessity that key personnel be technical is probably necessary from the point of view of the technology involved.

In this organization (as in any organization), the influence of specific individuals with personal interests and desires is felt. Their influence, together with that of the supervisory training and human relations programs in current use, tends to modify the more bureaucratic features. Thus, the rejection of some bureaucratic features is both recognized and approved in ARC. Many officials realize that their

to find out who is more powerful. There was much variation among higher officials about each other's influence on the daily running of the organization. It appeared in the absence of the managing director, the general manager of Commercial Division had become the most powerful, but was it because of his job position or because of his personality?

actions are not always guided by the "rational" application of bureaucratic rules. Furthermore, officials often refer to professional standards as the basis for their actions.

Bureaucracies are generally thought to be rigid social systems in which functions, responsibilities, and spheres of competence are clearly defined. This has been questioned in empirical studies, and our data tend to support these doubts. In general, professional employees resist rules made for them by administrators, because in the ARC organization the key people are engineers and technical people, and their attitudes toward work do not seem much different from those of professionals at middle and other levels. Furthermore, the technical personnel of the organization would argue that they are able to construct a more "rational" structure, because they understand the technical activities better than any administrator. Many of the engineering personnel thought administrators to be only "pencil pushers" (Brown, 1954).

A predominant view was observed among professionals at higher, and at supervisors', levels; they viewed their subordinates as professional specialists and hence treated them as equals rather than subordinates (Drucker, 1952). When a department is viewed as an association of professionals, the informal arrangements seem appropriate. But a bureaucracy should maintain schedules and follow orders. Many of the engineers felt most comfortable with the highly personal arrangements. Those individuals who preferred to receive direct orders from a single supervisor found it difficult to live with this type of system.

Throughout the process of assigning tasks to groups and individuals, problems arise. First, task responsibility is to be assigned to

the most appropriate group. The urgency of the work is to be established. Then a specific decision is to be made as to who can or should perform the work. Cooperation between structurally separate groups is often required. Branches and divisions often have different operating customs and rules. Finally, individuals differ in their attitudes toward accepting work without the explicit approval of their branch heads or section heads.

In general, cooperation within divisions has been more common than cooperation between divisions. The work of each division was relatively self-contained, so interdivisional cooperation was infrequent. The need for interdivisional cooperation was pressing. Many of the staff officials have had some engineering technical training. As technical work carries more prestige than administrative work, some of the technical personnel feel that the staff officers were engineers who failed to "make the grade" technically, and hence obtained high level jobs for themselves in administration. Consequently, staff officers are often at great pains to demonstrate their technical knowledge to other personnel. In addition to the distrust of the technical ability of staff officials, there is a running struggle for influence with higher management between ambitious line staff personnel.

Some of the difficulties between the staff and line groups common in other types of organization are present in the ARC organization. These include feelings that the problems faced by each group are not appreciated by the others, and "jockeying for influence with higher management between staff and line officials" (Brown, 1954).

Most of the higher civil service jobs involve supervision. Thus groups are sometimes established in order to reward an able person with a higher position. Cases of this kind occasionally arise when an ambitious and able man receives an offer of a better job elsewhere. His threat to resign may induce his supervisor to create a higher position for him.

But these judgments by management are not always appropriate. The cost of retaining the employee in the organization and the cost involved in letting him go, are not always balanced. The turnover rates of the professionals were high in spite of the fact that the general unemployment level of engineering personnel was quite high in India and the time of the study. Another aspect of this problem relates to the length of time that individuals have spent with the organization. The ARC organization is fairly recently established, and people take up jobs to initiate careers, and as soon as they get a better job, they leave the company. One top official noted that this is a problem relating to individuals' sense of obligation: "When they needed jobs, we provided them with jobs, better conditions, better pay, and better benefits. Now that we have taken off they are dropping out in favor of some other job elsewhere."

The ARC organization is not really high on bureaucratization in the Weberian sense. It is a moderately bureaucratized organization. Rules are adhered to, there is a certain flow of work, etc. But the rules are not blindly followed. Situations and needs dominate the work flow. This has also lead to an elusive, unclear, and imbalanced structure of each of the four departments in connection to the overall

organization structure.

A very important phenomenon observed was that human factors like possession of information, leads to added prestige and value in the organization. For example, when a subordinate is deputized to attend a meeting, what he reports may not reflect certain happenings as it is irrelevant in his view, and/or he may do so because by doing so, he may remain the only source of information. Hence, others would seek him for information, his prestige would be heightened, and he can talk more directly to higher levels.

The Context of the Present Study

The ARC organization, it appears on the whole, is more like a small unit or batch production type organization, as outlined by Woodward (1965). But a close examination shows that the production department is more like an assembly line organization, compared to the other three departments--commercial, administration, and finance, which are much more like small batch or unit production type organizations. The ARC organization produces steel structures, which are ordered by clients. Hence, meeting the client's order is very necessary. The communication behavior of both formal and informal systems in this case are important, because there is nothing automatic about the way that the technical function has to be performed. Dependence of one on the other or, to put it differently, a constant interaction, is required as the technology involved may be routine, but procedures of getting the work done may be non-routine. Hence, a constant initiation, reception, and feedback evolve, which results in changes between superior, subordinates, equals,

and operatives. Also, communication behavior is more predictable because employees work on one product at one work station, and furthermore a short time cycle is involved. So the social and technical communication behavior become patterned. Furthermore, in the unit or small batch production technology, communication is tied with the marketing, development, and production cycle. The mode, amount, initiation, function, and direction of communication in the above cycle determines the effectiveness* of the organization. It is important here, as also noted by Woodward (1958, 1965) and Perrow (1967, 1970), that small batch type organizations are dominated by engineering personnel. But this domination does not necessarily make production the most important function over those of the commercial, administration, and finance departments. Related to the above issue are the issues of the mode of communication, amount of communication, issues of who initiates communication, and at what level and about what, issues of does the message fulfill the various functions like getting the job done and encouraging and inducing change, in the organization. Perrow says that in the unit technology groups,** "It is a venerable and generally unchallenged observation that to foster cooperation among

*Effectiveness is measured in terms of "goal achievement" to the extent that organizations come close to their objectives are effective, and to the extent they fail to meet their goals, they are ineffective.

**In the mass production category, they found that this tended to fail. In fact, in cases where the design of the shops was such as to force the interaction of different groups, such as production and research, Woodward found relationships to be the poorest. In process categories, the results were similar to these of the unit type.

groups, it is necessary to bring them into closer working contacts. Often this is what is meant by 'better communication,' or 'breaking down walls.' Woodward found . . . in the unit . . . , no particular effort was required to bring people together, interaction was built into the technology. Conflict was low in these cases. Thus, it might be wise to reduce communication or to build a few walls in certain kinds of technological systems" (1970, pp. 88-89).

The variation in interaction patterns of socio-technical communication, Woodward (1968) notes, depends on differences in familiarity with products and methods. Also, these variations depend upon degrees of specialization,* different types of delegation and discretion, and, in general, differences in various power authority influences and structures of the organization.

Woodward suggests that in the unit technology organization, the central problem involves the need to innovate (respectively, product development and marketing), and decisions made through a formal hierarchy might be slow and unoriginal.** Hence, the communication systems become more oral than written and a decision is made on the spot, and later communicated to the administrative cadre. Also, levels of authority are bypassed and decisions are made directly.

*Silverman (1970) notes that in unit, there is little specialization among the functions of management, because the number of specialists employed is smaller and line management therefore has to be technically competent.

**Silverman (1970) notes that in the mass production units there is a more rigid and bureaucratic communication, because the central problem is efficient administration of production.

The top-level people in the Production Department many times go to the workshop directly, rather than sending a memo and asking for a written reply. In a unit production type, the initiation of messages is more determined by situation than by formal structure. The superior or a subordinate, whosoever may have a question, may initiate the message within his own level, above, or at a lower level. Because in unit types, a large number of decisions have short time consequences, it is usual that decisions are made on the spot and later communicated. Hence, communication channels carry messages which have information about already-taken action, directives, facts, suggestions, etc.

Summing up, organizations are involved in routine and/or non-routine jobs (Perrow, 1967, 1970).^{*} Organizations' routine jobs lead to highly bureaucratized forms of administration, and non-routineness of job leads to a relatively lower bureaucratization in administration. Communication is determined by jobs, both routine and non-routine. Communication in the ARC organization is more verbal because of the presence of engineering personnel. The weak distinction between experts and

^{*}Perrow (1970) distinguishes work performed in the organization, based on its degree of routine or lack of routine. But he says, "if we analyze the term 'routine' more closely, it appears that we mean that two conditions are at work, and these are applied to essentially similar raw materials. That is, there is little certainty about methods and little variety or change in the task that much be performed. Similarly, non-routineness means that there are few well-established techniques: there is little certainty about methods, or whether or not they will work. But it also means that there may be a variety of different tasks to perform, in the sense that raw materials are not standardized or orders from customers may ask for many different or custom-made products.

In essence, the distinction between routine and non-routine is not clearcut because it is possible to be non-routine in one sense and not in another, or routine in one sense but not in another.

administrators also makes this organization depend more and more on decentralized decision-making and in results being communicated to higher levels.

In short, the mode, amount, initiation, function, and direction of communication is a function of the work relationship in the organization; the communication systems are incorporated in the technical system of the organizations.

Analysis of the Technical Variable

Technology is defined here as "those actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make changes in that object. The object, or 'raw material' may be a living being, human or otherwise, a symbol or an inanimate object" (Perrow, 1967, p. 195). Communication is the transmission of ideas from a source to a receiver, with the intent of changing his behavior. It appears that both technology and communication are geared toward the "transformation" of behavior and raw materials.

Data regarding the technical variable was gathered through observation, essentially. Additional data was obtained through interviews, built around the following questions on technology:

1. Can you explain what you understand by the term "technology"?
2. Is the technology used by you, and in your Department, more complex (compared to other three departments)?
3. On the present continuum of technical complexity, where would you put your Department? [Show the respondent Figure 4-8]
4. Is your job unusual, or involve exceptional situations often?

5. Does your job call for standard solutions, or you have to use your judgment?
6. Are your work tools mechanical only?
7. Is your job, or the material you work with, always the same from case to case and time to time?

All respondents answered those questions. A synthesis showed that the Production Department seems to be using more complex technology, as compared to the Commercial, Administration, and Finance Departments.

The term technology* was operationalized in terms of the level of mechanization in the department. It was observed that the Production Department had the highest level of mechanization, compared to the second group which had a much lower level of mechanization. This was our basic variable of technology, whereas there were other indicators like change, number of exceptions, alienation, use of judgment, stability, interdependence, etc., which were used to gather data regarding technological differences. Technology is mainly conceptualized in terms of manageability of tasks and materials--essentially the predictability

*Technology as a general variable subsumes so many ideas that it is difficult to specify the exact technical variable. Woodward's (1958, 1965) classification of production technologies as simple or complex is the earliest attempt, but largely relates to manufacturing organizations. Perrow's (1967, 1970) routine and non-routine nature of technology is too general and does not include elements like level of noise, dirt, and layout or the amount of energy used. Litwak (1961) talks of technology in terms of uniformity and non-uniformity. Harvey (1968) talks of technology as being diffuse or specific. Blauner studied the consequences of technology on the individual as being alienating or involving. Thompson (1967) classified technology in terms of the task with three general categories (1) long-linked technology (2) mediating technology, and (3) intensive technology. This classification seems to apply not only to industrial organizations (like Woodward's), but to more general types of organizations, such as hospitals, insurance businesses, banking, etc.

dimension considered at the individual level--and further conceptualized in terms of uniformity and complexity. Manageability means (1) exceptions in the work with which one deals, (2) standardization of ways of problem-solving, as compared to the use of judgment, (3) a narrative account of how intricate or complex the job is, compared to the other three departments, (4) uniformity of technology, in terms of the similarity of materials and/or task from case to case and time to time, and (5) complexity of technology was determined by asking how simple the material and/or task were.

It was found the Production Department used more complex technology than the Commercial, Administration, and Finance Departments, based on the above indicants. Production Department respondents at all levels said that they encountered more exceptions than any other department, and that the use of judgment was greater by them, as they had to make on-the-spot judgments when something unexpected happened. Techniques varied from time to time as a particular product demanded. Uniformity in production techniques. The Production Department respondents said that their technology was the most complex, compared to the other three, as their level of mechanization was much higher. The differences between the groups was much less on variables like predictability, change, stability, and dependence, than on the level of mechanization.

Further determinants of technological complexity were the technical or professional qualifications of the respondents. Secondly, the nature of technology was determined by the department to which the respondents belonged. Salary was an indication of technical complexity, because more money was paid to the technical people in the Production Department,

than in the other three departments at the same hierarchical level. Also, importantly, the hierarchy was taller in the Production Department than in the other three. This led to the belief that production technology was more specialized, more detailed, and more diffused than the other technologies involved in the organization. It was found that the greatest numbers of technically-qualified respondents were in the Production Department. Also, they were on the average younger than in the other three departments. Nature of work was mostly listed as technical by the Production Department employees, compared to employees of the other three departments. In terms of geographical mobility, the Production Department employees were found to be more mobile. Production Department employees mostly came from the state whose mother tongue was not Hindi.

The data on age, training, geographical mobility, language, etc. indicated that the Production Department was much different from the other three departments.

On the basis of data gathered regarding technical variables of level of mechanization, manageability of tasks and materials, and uniformity and complexity of tasks, a continuum of technology was developed, and used as the basis for the present study (Figure 5-16).

The four Departments of the ARC organization are grouped in two categories. The Production Department is in Group I, which is highly mechanized. Group II includes the Commercial, Administration, and Finance Departments, which use much less mechanized tools for task performance. The two groups are much more similar on variables of manageability, complexity, and uniformity of tasks.

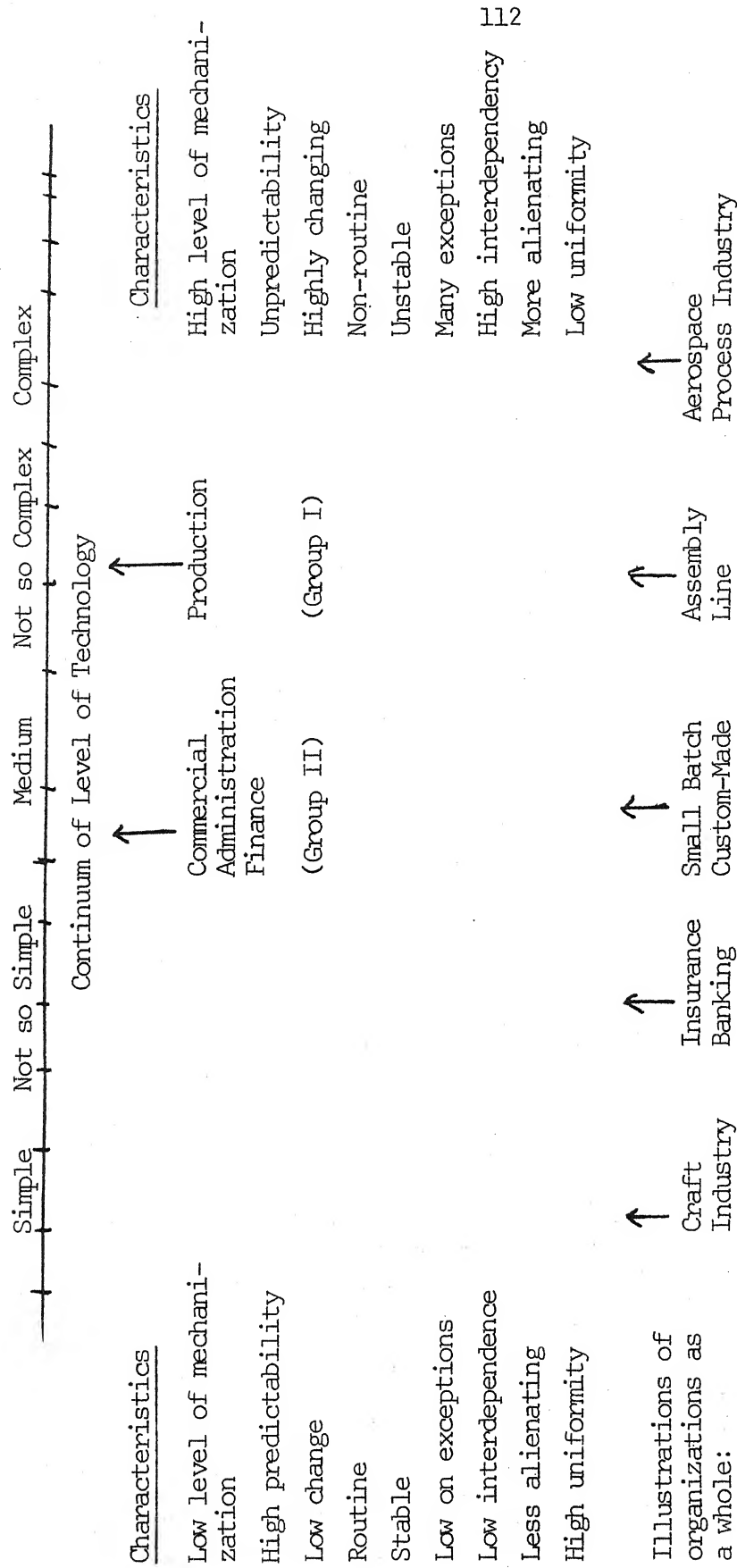


Figure 5-16. Continuum of Technology Developed for Studying the ARC Organization.

Group I is more like an assembly-line type of production unit, while Group II is more like small-batch or custom-type of organizations.* Group II is in the middle of the continuum, the characteristics mentioned at the two ends of the continuum are from left to right in the order of low to high. It is assumed that Group II is more close to Group I in terms of technological characteristics. In other words, Group II has, for example, a high rate of change but not quite as high as that of Group I. So in essence both groups are on the more highly complex side of the continuum, rather than the less complex side of it, for most characteristics, with the exception of mechanization.

Summing up, data on levels of technology were found mainly through observation of operations, opinions of the respondents, and company reports. In addition, there were questions asked regarding predictability, complexity, uniformity, and in general the nature of job. Respondents' information regarding analysis of the technical variables was derived from the questionnaires. The nature of work, technical or professional training, the hierarchy of the department, etc. were used as indicants of technology for various departments. A continuum of technology is developed on which two groups were based. The technology grouping is developed for use as the basis for comparing communication behavior. Further, within these two groups, levels of management are compared on their communication behavior.

*See Reeves and Turner (1972), who studied technology of small batch, as compared to an assembly-line, production, and found the differences of technologies based on production.

Analysis of Communication Behavior

The communication systems are studied in terms of five variables: Mode, amount, initiation, function and direction of communication. The variables are operationalized in the following manner.

Mode of Communication - Patterns of choice showing consistency of channel selections in performing the linkage functions. Written and oral modes of communication are studied.

Amount of Communication - Total volume of communication contact is measured in terms of frequency with which messages are sent and/or received.

Initiation of Communication - Information exchanged among members: what proportion is sought, compared to given.

Message Function - Messages can have either a function of getting the job done (production-orientation), or they may function as innovating agents.

Direction of Communication - Communication in organizations take directions which are vertical or horizontal.

These variables are components of the communication system, and hence are to some degree interdependent. These variables co-determine each other. Studies as early as Indik (1963), Likert (1961, 67), and Schein (1951) have not dealt with communication variables in the above-mentioned ways. It becomes important to see how they make an organizational communication environment. A review of literature helps toward this goal.

The communication variables in their various dimensions were studied. By "dimension," we meant various organizational situations, occurring (i.e., crisis or strike), practice found (unnecessary communication, deleting information, short-circuiting channels, unofficially spreading information, etc.), groups evident (formal/informal dealing

with certain types of messages, modes, speed of channels, etc.), results of interaction (like goal achievement, innovation and change, compliance vs. decision-making power, efficiency or effectiveness), which usually can be understood when viewing the organization's communication behaviors. Many times organizational communication behavior shows that in crisis situations total communication increases on the whole, written and verbal communication. Also in the crisis situation, we find that more factual data is wanted, and that the authoritativeness of message is considered very important. The following five variables relate to various organizational dimensions of situation, practices, groups, and results.

Mode of Communication

The mode means the method or choice of channel of interaction. The channels studied are written and oral.* Communication can take the form of written reports, memo, bulletin board notices company records, budgets, etc. In oral form it includes, speeches, small group discussion, meeting, in essence all face-to-face interpersonal contacts. Included are conversations on the phone, or telecommunication, or short circuit T.V. - etc. Studies as noted previously show that in an organization where there are more technical personnel, there is a tendency for more oral than written communication and also that as one moves from top to lower levels, one may observe decreasing rate of written communication. Oral communication are found among equals, on the whole, more horizontal

*There is one more channel non-verbal. Studies (Hall, 1959, and Birdwhistell, 1959), have shown importance of it. But definition and measurement, based on observation and record method of non-verbal variables, are very difficult and yet not developed enough for general use.

communication than vertical seem to cater in an organization. Table 5-2 synthesis the results from available studies.

Table 5-2. Mode of Communication

Authors	Findings and/or Opinions
<u>Barnard</u> (1937)	For routine jobs, whether written or oral, communication messages need not be authenticated. But in crises, non-routine job occasions it is important to have authentication of written as well as oral messages.
<u>Weinshall</u> (1964)	A study of 34 executives, recording two weeks of interaction, found 78% preferred direct talking, and only 22% preferred the telephone. Forty-four percent of the meaning of communication was understood with verbal and face-to-face channels, but 60% of meanings in the telephone verbal contacts were not understood as intended.
<u>Guetzkow</u> (1965)	Written messages occupy space in terms of filing and retrieving.
<u>Baker</u> (1948)	Found in his study of 40 firms, that more reliance was placed on the written word, because the size of the organization presented ascertaining the accuracy of verbal communication.
<u>Carlson</u> (1951)	German industrialists averaged 70% of their time in verbal communication.
<u>Stogdill and Shartle</u> (1951)	Found that 470 Navy officers spent 60% of their time in verbal communication.
<u>Ulrich, Booz, and Lawrence</u> (1950)	Found that 50 to 60 percent of department heads' time was spent in verbal communication with men from outside the department.
<u>Dubin</u> (1962)	Written communication simply did not have a chance when oral communication demanded so much of the executive's time.

Amount of Communication

Amount is operationalized in terms of the frequency of communication. How much information is exchanged, and the total interactions recorded and perceived, are some of the more common methods used in previous studies for measuring the amount in communication. Burns (1954) found that in five weeks a group of high executives recorded all their communication. They kept records of the subject of messages exchanged, the amount of time spent on each subject, and the people involved in these various transactions. It was found that more than half of the time, the superior perceived that he spent in giving directions. Another study included 5,135 interactions among a group of 34 executives over a period of two weeks; the amount of communication activity with equals was highest. Table 5-3 shows the results from available studies on amount of communication.

Initiation of Communication

Initiation is operationally defined in terms of the individual's effort to seek information, versus information being given to him. In other words, it is defined by his activities as either a sender of messages, across and within levels in the organization. In organizations some centers are more active in terms of message-generation and are correspondingly active in message reception also. The present study shows that the percentage of communication messages initiated by managers to their superiors was 36 percent (41 contacts), to their equals 51 percent (183 contacts), and to various subordinates, respectively, senior staff 58 percent (402 contacts), design planning staff/foreman 62 percent (154 contacts), working supervisor/senior clerks, 74 percent (27 contacts),

Table 5-3. Amount of Communication.

<u>Authors</u>	<u>Findings and/or Opinions</u>
<u>Simpson</u> (1959)	Found among supervisors at three levels that the most frequent communication was among lower-level supervisors; it was more horizontal than vertical.
<u>Faunce</u> (1958)	Increased mechanization results in increased supervision, which means more total amount of communication.
<u>Blau</u> (1954)	More competent persons in a government office have more frequent and longer communication, than the less competent.
<u>Jackson</u> (1959)	Found that communication frequency is related to social-type work, and to attraction toward the organization.
<u>Jaisinski</u> (1956)	Found the frequency (or amount of contacts) depends on the nature of the work performed.
<u>Dubin</u> (1958)	Those who send more messages also receive more messages. Amount depends on the member's tendency for high or low initiation.
<u>Guetzkow</u> (1965)	Message overload is part of the amount of communication in a pyramidal organization; a small number of recipients at the upper level are flooded with messages originating at the numerous levels below, and hence the upper levels are unable to respond on a one-to-one basis.
<u>Shelley and Gilchrist</u> (1958)	The amount of communication under pressure requires immediate handling; this leads to not handling some relevant information. The amount of communication influences the reading or not reading of relevant information.
<u>March and Simon</u> (1958)	The amount of communication is greater in the organization because of the lack of an adequate language to encode messages. At each transmitting points the message needs to be summarized and synthesized, resulting in a large amount of repetitive communication.

and apprentices/typists, 62 percent (63 contacts). It is clear that there is an inverse relationship between the proportion of initiation and organizational rank. As one goes from high to low ranks, the proportion of initiation increases. In an organization there are more than one initiating points, and as many receiving points (Guetzkow, 1965). A study done by Guest and Walker (1954) showed that at the supervisory level about 70 percent of their respondents sought communication with their supervisors less than once a month, due to the high mechanization of jobs. Table 5-4 summarizes the results of available studies on the initiation of communication.

Table 5-4. Initiation of Communication.

Authors	Opinions and/or Findings
<u>Hovland</u> (1948)	Pointed out that much social communication is man-to-man, involving merely a source and a destination.
<u>Guetzkow</u> (1965)	In organizations, the destination often consists of more than one person, when the initiator talks to two or more individuals, as in the briefing session and the sending of memos.
<u>Guest and Walker</u> (1951)	Found that of 180 assembly line workers, only 59 said that they talked to superiors once a week. Fifteen said 1 to 3 times in a week; 88 said less than once in a month. So 70% initiated the contact less than once a month. Initiation at the lower levels is much less, and it depends upon how the initiator views the receiver at the other (higher) end.
<u>Mechanic</u> (1962)	Reported that when at the higher level, people are viewed as having considerable access to, and control over, information, communication messages are directed to them.
<u>Simpson</u> (1959)	Found among eight foremen, that 43% to 76% of the contacts were initiated and received by peers only. A high proportion of the remaining went to the lower levels, and very little went to higher levels.

- Burns
(1954) Found in a group of managers that they initiated the least numbers of messages to, and received least the number of messages from, apprentices and typists in the chain of command. They initiated and received from senior staff, foremen, and supervisors about the same number of messages.
- Jasinski
(1956) Found that in one department of eleven foremen with 330 contacts, three quarters of all communication messages were initiated to, and received from, foremen immediately above or below the respondent.
- Bales
(1951) Social communication is characterized by regular initiation-response tendencies.
- March
(1965) Those who put in more communication acts tend to be recipients of more input. This exchange reflects the operation of basic reward and punishment mechanisms, within the communication process.
- Landsberger and Miller
(1957) Studied two factories of size 300 to 500 making similar products; department heads indicated an equal balance between initiation and reception of messages. Those who initiated more, or sought more, contacts, also were receivers of many messages.
- Habbe
(1952) In a questionnaire study of two industrial plants, found that supplying more information to employees created the desire for more information.
- Dubin
(1958) Proposed that the initiation (or seeking of information) of communication is invariably related to organizational ranks. The proportion of initiation goes up from high to lower ranks, when the difference in ranks between initiator and recipient is greater.
- Blau
(1954) Studied a group of officials in a government agency, and found that among 16 peers, more competent people received more communication from the group, but they did not initiate more contacts, compared to their relatively less competent colleagues. Less competent people received 60% less communication but spend more time informally making up for this gap, and felt a greater need for improving their interpersonal skills, and showed greater initiation. But this initiation was in their informal or horizontal groupings, rather than in the formal or vertical interpersonal interactions.
- Donald
(1959) Found parallel rates of initiation and reception among officers of various ranks on the League of Women Voters of the United States.

Function of Communication

Communication within organization can be studied in terms of the various functions that they perform. Thayer (1968) points out that communication has many functions: Informative, command, and instructive; influence and persuasive; and integrative functions. The information function, he says, is basic to all of the other applied functions of communication. In the present study we deal with the production function, which seems to be a combination of command or instructive, and encouraging innovativeness, rather than the influence and persuasive function.

The innovation function of communication is vital also. It encourages receivers through influence and persuasion, to accept new ideas. Members in the organizations, when they perceive an idea or method as new, try to obtain further information, when they are initiators of the ideas; they also provide answers to questions directed to them. Table 5-5 synthesizes the results of some of the important studies on the function of communication.

Table 5-5. Function of Communication.

Authors	Opinions and Findings
<u>Glover</u> (1954)	The efficiency of performance in the organization is related to the function that communication performs in letting the person know the details of his job.
<u>Thayer</u> (1968); <u>Guetzkow</u> (1965); <u>Glanzer and</u> <u>Glaser</u> (1961)	They suggest that the characteristics of the task which need to be done determines to some extent the contents of the message, and in general the impact of communication networks.

<u>Burns</u> (1954)	Found in the production department of a British firm that half of the time the manager thought he was giving instructions or decisions, but the subordinates recorded his receiving information or advice only.
<u>Ross</u> (1956)	Indicates that messages which have a command function control the goal behaviors of employees, and provide information and ways of getting the job done.
<u>Jaisinski</u> (1956)	Found that task-oriented messages may vary in subject. They also move in certain directions. The amount and speed of such messages varies from level to level.
<u>Berlo</u> (1970)	Communication has three functions in an organization. (1) production, (2) maintenance, and (3) an innovation or change function.
<u>von Mises</u> (1944)	Communication in a bureaucratic setup usually is directed toward task completion and compliance. The innovative function of communication is unheard in a bureaucracy.
<u>Crozier</u> (1964)	Found in France that because of the absence of effective feedback and the weight of impersonal rules, formal organization resists change as long as it can. Hence, the communication function becomes one of maintaining the system through task completion.
<u>Thompson</u> (1961)	The functions of communication are of problem-solving and innovation. Organizations evade official communication in order to get the job done. Hence, the communication function is to change and modify in order to cope with situations.
<u>Lewis</u> (1962)	Says that elites at the top of the organization do not do a good job of encouraging innovativeness and change. Consequently, the communication function becomes one of maintaining the old routines by circulating task-related messages.

Direction of Communication

Traditionally, the direction of communication has been in terms of upward and downward communication. Usually, chain-of-command had been taken to be a downward channel of management communication. In the present study, direction implies vertical (from top to bottom, and

bottom to top) and horizontal communication (of superiors, subordinates, and equals). Vertical communication usually denotes formal communication and horizontal implies informal communication. Vertical organizational communication has been much studied, and horizontal or informal have been neglected. Simpson (1959), in a spinning mill production department, found that at upper echelons of management, more vertical communication (and formal channels). At lower levels communication is horizontal (peer-to-peer communication). Faunce (1958) found that increased mechanization leads to increases in frequency and seriousness of machine breakdown, and hence resulted in a greater amount of vertical supervisory communication (i.e., reporting to upper levels, receiving instructions from above, and informing their subordinates). Formal channels are predominantly vertical, whereas informal are mostly among equals (horizontal).

The formal and informal communication systems indicate directions, as well as to some extent, the efficiency of the system. Table 5-6 summarizes some of the important studies on direction of communication.

Table 5-6. Direction of Communication.

Authors	Findings and/or Opinions
<u>Simpson</u> (1959)	Found the contacts of supervisors at three different levels can be categorized as vertical and horizontal based on the hierarchy. It was found that at higher levels, there are more vertical contacts, whereas at lower levels there are more horizontal communication. Supervisors at all levels have more vertical than horizontal communication.
<u>Stogdill and Shartle</u> (1955)	Much of communication takes place among organizational equals in order to coordinate work flow and operations. Getting information from rank-and-file workers is a

relatively important behavior of foremen, just as getting information about the organization is important for the managers.

Carlson
(1951)

Found the major investment of time is in getting information from lower levels as to what is happening, so that follow-up decisions and actions can be based on them. Executives' communication is highly verbal, and time spent on conversation diminishes as one goes down the ranks. A remarkable amount of time is spent with peers (horizontal communication) about task, as well as about non-task matters.

Jaisinski
(1956)

Found that among foremen at the same level, only 9.7% of horizontal contacts were about matters other than task. More than 80% of horizontal contacts also were formal, about the task.

Burns
(1954)

Found that communication contacts of managers with their superiors, peers, and subordinates differ in amount. Subordinates differ in amount and in terms of initiation. The contacts that managers had with their superiors and subordinates were vertical and superiors with peers were horizontal (there was no attempt to find the contents of the messages). The total vertical contacts were 687 in number, whereas total horizontal contacts were 183. Out of 687 contacts, 41 were with manager/superiors and 36% of these messages were initiated by the managers themselves. Managers initiated 51% of the total 183 contacts with their equals, whereas with subordinates, only 13% in total were initiated by the managers. At the higher levels, work-related formal contacts are more than at the lower levels; the number of messages initiated by lower ranks about work or task are very low in number.

Ponder
(1968)

Found that the foremen in their contacts with superiors, peers, subordinates, and others vary considerably.

Guest
(1958);
Piersol
(1958)

Their separate studies show that in the formal organization the greatest amount or highest number of communication contacts are with peers. In Guest's study the percentage of the time spent with equals was 46%, compared to Piersol's 60% of the time with peers. The conclusion can be drawn that horizontal and vertical channels both are used in organizations; the proportion is not much different. But across levels, proportions become different. As one goes down the ranks, more communication is horizontal than vertical within levels. As one moves up, vertical is more.

Cartwright
(1959)

Communication flows are determined by past experience. The "absence or malfunctioning of an articulation unit will have widespread repercussions for the organization." Articulation point are one "whose removal separates the graph [of the network] into two or more subgraphs which are not connected to one another." Further, he noted that "every point of a tree which is not an end-point is an articulation point, and the traditional organization chart is a tree. The high vulnerability of these structures may account for the frequently reported existence of 'formal' or 'unimproved' communication channels in such organizations."

Donald
(1959)

Organizational size has an impact upon the direction of messages. As the size of the organization increased, there were increases in the rates of vertical communication at top levels. Contrarywise, the rates of upward communication (from lower ranks to the officers) were related inversely to the size of the organization. So even though the officers had higher rate of communication as the size increased, the member-to-officer gap increased. Lateral rates of communication, though, remained about the same regardless of size.

Guetzkow
(1965)

Argues that "unorganized" communication, probably depending upon friendship nets, would seem independent of the formal structural. Had Cartwright's suggestion been applicable in its entirety, there would have been an increase in the informal channels of communication.

Barnard
(1937)

The ability of individuals to maintain communication in informal, face-to-face groups is limited; Donald (1959) supplied some empirical evidence that when size increases the formal-vertical dimension absorbs the additional communication burden, while the informal horizontal channel remains saturated.

Burns
(1954)

Found that informal "lateral" communication is essential to the proper functioning of the vertical system (p. 96). "The departmental manager might arrive back from a meeting with a crop of decisions affecting production. . . . This sort of occasion would be considerably disruptive, were it not for the existence of prior knowledge of varying specificity at the deputy's level, and at successive levels below him, that something was in the wind." The "vertical" system would be virtually unworkable without the considerable flow of information laterally" (1954, p. 92).

Mabbe
(1952)

Status is seen to effect the direction of communication. Despite the barriers of status, it is possible to achieve upward communication. Some of the attitudes and dispositions of members toward mobility and aspiration, among subordinate executives is negatively related to the accuracy of upward communication.

Read
(1963)

Upward communication sent by subordinates are not always accurate. This negative relationship is a reflection of the subordinates' desire to withhold or refrain from communicating information that is potentially threatening to the status of the communication.

The present study is now set to compare (1) Group I with Group II, with regard to their communication behavior, (2) the communication behavior of the three levels of management. The scheme for studying communication is depicted graphically in Figures 5-16a, and 15-16b.

Communication between Group I and Group II is studied, and this grouping is based on technological variables. It is clear that the level of technology is a given variable, whereas communication variables are actually what we are exploring.

The basic assumption of the present study is that organizations as a system of getting the work, for applying techniques to the problem of altering raw materials (people, symbols, and things), influence the basic work too--communication.

Secondly, an organization employs technology that is simple and complex, and highly mechanized and low on mechanization, depending upon the task which has to be accomplished. Within an organization some units are technologically homogeneous and heterogeneous. The homogeneity and heterogeneity of technology will influence communication behavior. The more alike groups probably will show more similar communication behaviors.

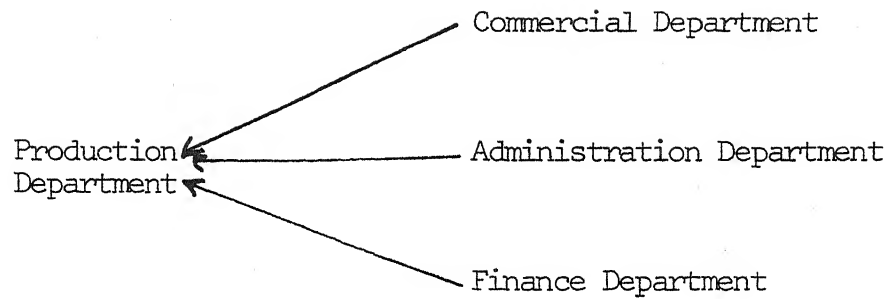


Figure 5-16a. Production Department Communication Compared to the Communication Systems of Commercial, Administration, and Finance Departments.

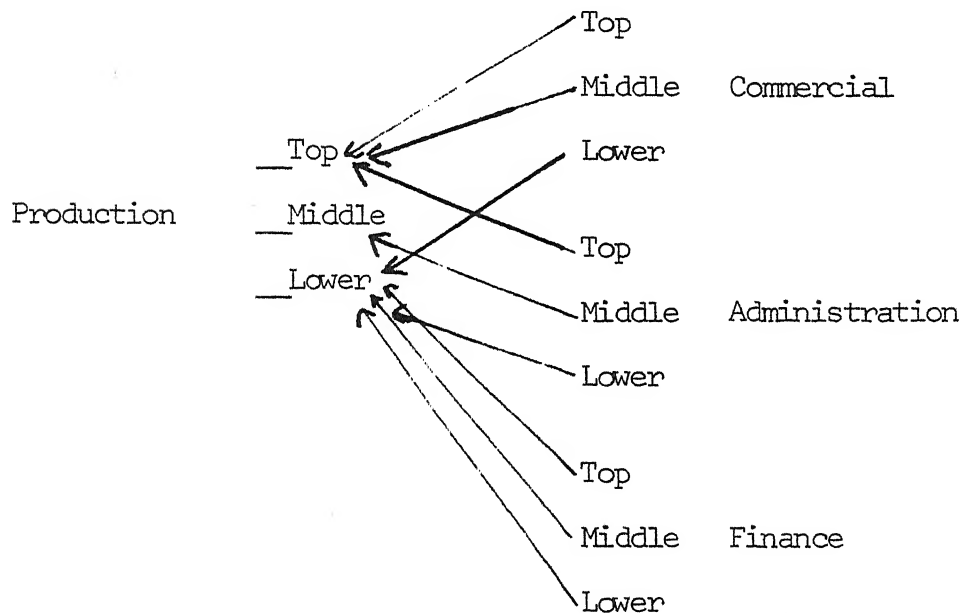


Figure 5-16b. Production Department Communication Compared to the Communication Systems of Commercial, Administration, and Finance Departments at Top, Middle, and Lower Echelons of Management.

Thirdly, within top, middle, and lower echelons of management, the communication behaviors will be more similar within each level, than between levels.

Hence in the study a continuum of levels of technology is developed, and the departments are grouped in the categories based on the levels of technology.

The Sample Characteristics

At the time of the study, there were 1,650 employees in the ARC organization. These employees were distributed in the four departments of the company: Commercial, Production, Administration, and Finance. Since this company is an engineering concern, the Production Department was the largest in size (number of employees). The structure was also much taller, and there were more levels in the hierarchy of the Production Department. The Commercial and Administration Departments were fair-sized, whereas Finance was the smallest in terms of the total number employed.

The 60 percent of the total members of the ARC organization were from the state of Uttar Pradesh. Only 40 percent of the people were from other states. It seemed that technical people at higher, and some at the middle, level came from other states. They were professionally mobile (Warner, (1958)). As far as the officers on deputation were concerned, there were only about ten people at the top. They were appointed for not less than three years or until the continuation of the job.

Out of these 1,650 employees, we have taken a sample of 250 people from the 474 people of the first three levels (that is, top, middle, and

lower levels). In the top level, there were 42 members of the organization; we took all of them in our sample. Hence, at the top level the sample was the entire population. As the middle and lower levels, we took a sample of 58 percent and 42 percent, respectively.

Table 5-7. Total Population Sampled.

Level	Total Number	Percentage
Higher	42	3%
Middle	167	10%
Lower	265	16%
(Other lower levels)	1,176	71%
Total	1,650	100%

Table 5-8. Final Sample of 250 Respondents.

Level	Total Number	Sample Number	Sampling Rate	Sample Percentage
Higher	42	42	100%	17%
Middle	167	97	58%	39%
Lower	265	111	42%	44%
Total	474	250	-	100%

The distribution of members in the top, middle, and lower levels was based on pay scales, and the organizational designations associated with them (Table 5-9). The categories made were as following:

Table 5-9. Management Hierarchical Levels.

	Top Level	Middle Level	Lower Level
Designation	Managing Director, General Managers, Managers, Secretary, Head of the Department, Department Officers, Sectional Heads, etc.	Assistant Officers, Foreman, Supervisors Gd. I Assist. Engr., Sr. Accountants, Private Secy., Draftsman Engineer	Supervisors, Sr.II Steno-typicsts, Group Head Gr.II, Personnel Assist., Assistant
Pay Scales	Rs. 951-2,000 & above	Rs. 451-950	Rs. 250-450
Total Numbers	42	97	111

The educational and technical qualifications of the respondents were determined (Table 5-10).

Table 5-10. Educational Levels of the Sample Respondents.

Educational Level	Hierarchical Level			Total
	Top Level	Middle Level	Lower Level	
Above Graduate	15.2%	6.8%	3.2%	25.2%
Graduate	1.6%	20.0%	8.0%	29.6%
Intermediate	-	8.0%	15.2%	23.2%
High School	-	4.0%	18.0%	22.0%
Below High School	-	-	-	-
Total	16.8%	38.8%	44.4%	100.0%

Table 5-11. Technical Qualifications of the Sample Respondents.

Technical Qualifications	Hierarchical Levels			Total
	Top Level	Middle Level	Lower Level	
Special	1.6%	10.8%	7.2%	19.6%
At Graduate Level	15.2%	16.0%	4.0%	35.2%
At Lower Levels	-	12.0%	33.2%	45.2%
Total	16.8%	38.8%	44.4%	100.0%

Table 5-9 shows that in our sample of 250, 25.2 percent of the respondents have above graduate degrees. These "above graduate" degrees in most cases meant special training or special courses (i.e., diploma in business administration), which the respondents had done. The corresponding number with technical qualifications which had special training is 19.6%.

Table 5-10 shows that 29.6 percent of the people had a Bachelor's degree, while 35.2 percent had a technical qualification at the Bachelors' level (Table 5-11).

About 23.2 percent of the members in the top and middle level had education at the intermediate or higher secondary level. Only 22 percent who had education until high school were at the lower levels. In our sample there were no members who had education below high school. It becomes evident that people were generally well-qualified in formal education.

Since the organization is fairly new, we thought it would be helpful to have some data points as to the length of service that members have put in (Table 5-12).

Table 5-12. Years in the Present Organization.

Number of Years	Hierarchical Level			Total
	Top Level	Middle Level	Lower Level	
More than 3 years	7.2%	20.0%	24.0%	51.2%
1 to 3 years	8.0%	14.8%	10.0%	32.8%
Less than 1 year	1.6%	4.0%	10.4%	16.0%
Total	16.8%	38.8%	44.4%	100.0%

Table 5-12 shows that out of 250 respondents, 128 or 51.2 per cent had been in the ARC organization for more than three years. The organization relationships were fairly stable and patterned as the average time spent by members in the organization comes to be more than 18 months; that is, more than 50 percent of the respondents had been there for three or more years.

The sample was classified (Table 5-13) on the basis (1) of organizational structural position (that is, the departments they belonged to), (2) the nature of the work performed (whether technical, administrative, or clerical), and (3) their age.

Table 5-13. Percentage Relative Frequency of Respondents in Various Organizational Positions.

Department	Hierarchical Level			Percentage of Respondents
	Top	Middle	Low	
Commercial	4.4%	4.4%	5.6%	14.4%
Production	8.0%	25.2%	25.6%	58.8%
Administrative	3.2%	5.6%	10.0%	18.8%
Finance	1.2%	3.6%	3.2%	8.0%
Total	16.3%	38.8%	44.4%	100.0%

Of the 250 respondents, 14.4 percent were working in the Commercial Division (Table 5-14). The Production Department had the greatest number of people, 58.8 percent. More than half of the workers were in the Production Department. At the top level only 8% of the people were in production department. Finance was the smallest department with 8 percent. In total, at the top there were 16.8 percent of the people, at the middle there were 38.8 percent of the sample, and 44.4 percent were at the lower level.

Table 5-14. Percentage Relative Frequency of Respondents in Various Departments and in Three Age Groups.

Department	Age Group			Total
	Above 50 years	30-50 years	Below 30 years	
Commercial	1.2%	9.2%	7.6%	18.0%
Production	0	26.4%	20.0%	56.4%
Administration	2.0%	13.2%	2.4%	17.6%
Finance	1.2%	5.6%	1.2%	8.0%
Total	4.4%	64.4%	31.2%	100.0%

The general trend in Table 5-14 is that the Production Department has relatively younger people, compared to other three departments. Generally, relatively young employees were in the ARC organization.

The sample was also classified on the basis of the nature of their work in various departments. Table 5-15 show a trend for administrative personnel to be concentrated at the top level, and technical and clerical personnel to be concentrated at the lower level (Table 5-15 and Figure 5-19).

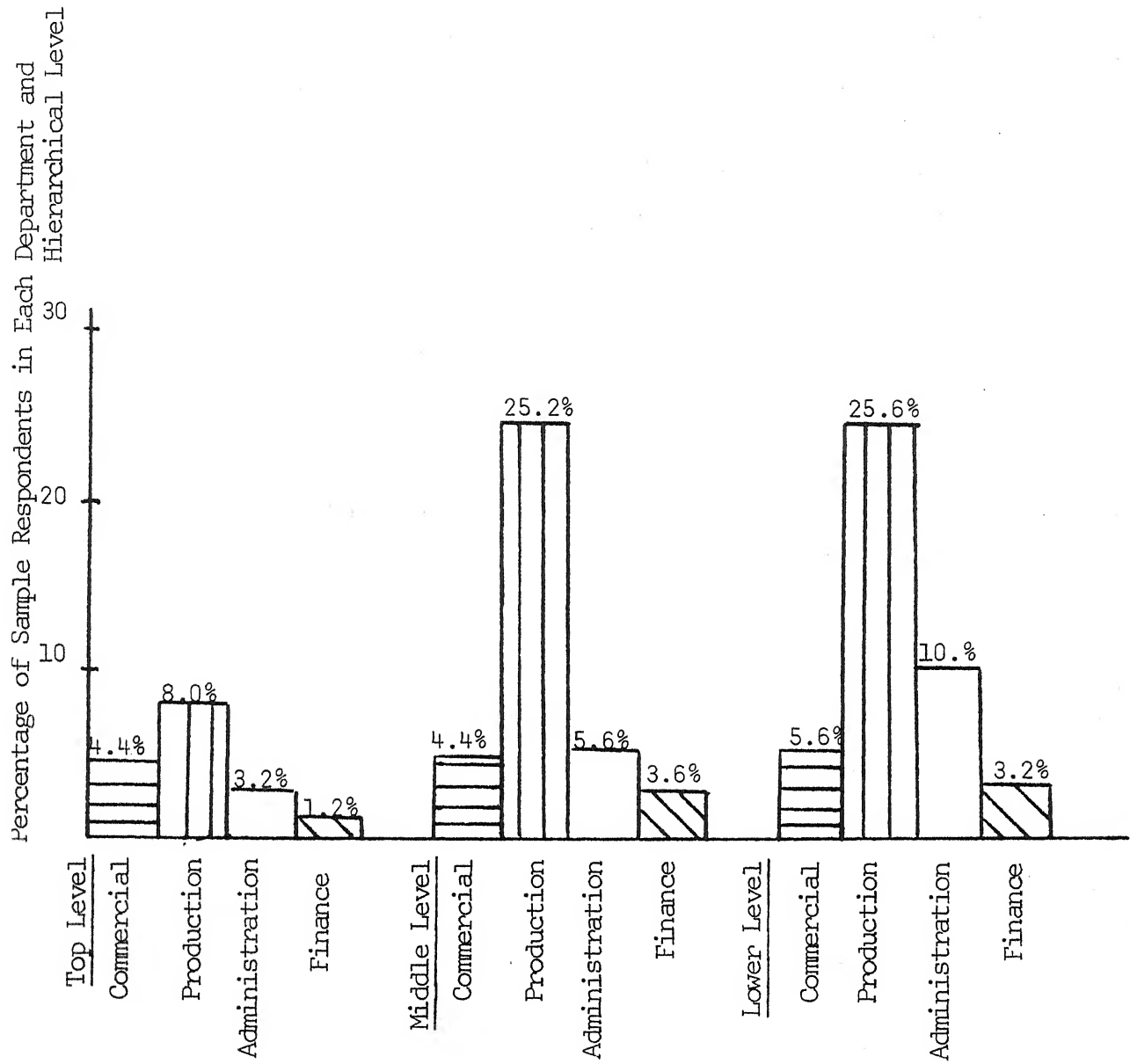


Figure 5-17. Departments and Hierarchical Levels of the Sample Respondents.

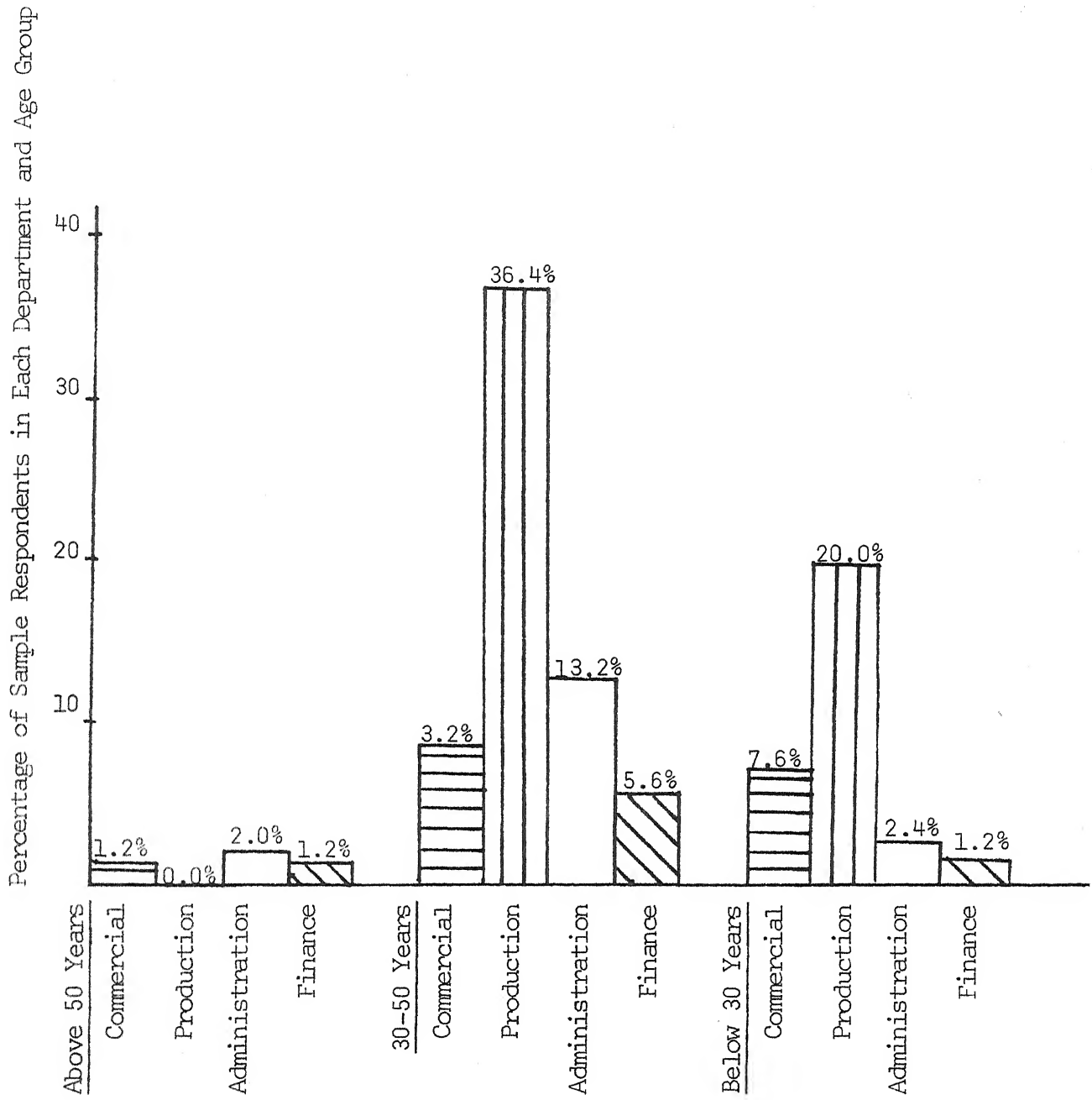


Figure 5-18. Departments and Age Groups of the Sample Respondents.

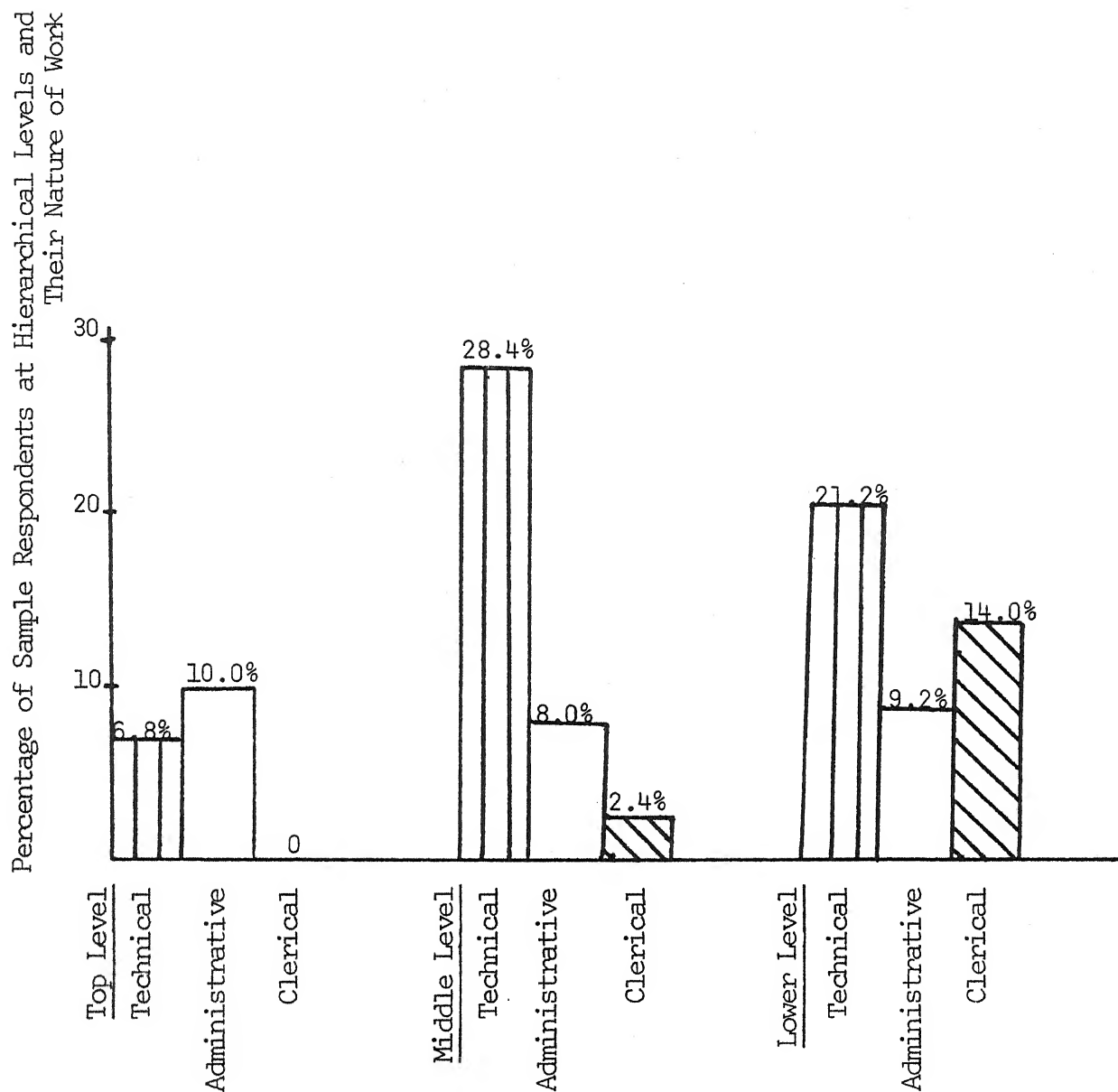


Figure 5-19. Hierarchical Levels and the Nature of the Work of the Sample Respondents.

Table 5-15. Percentage and Relative Frequency of Respondents Based on the Nature of Work at Various Levels.

Nature of Work	Hierarchical Level			Total
	Top	Middle	Lower	
Technical	6.8%	28.4%	21.2%	56.4%
Administrative	10.0%	8.0%	9.2%	27.2%
Clerical	0	2.4%	14.0%	16.4%
Total	16.8%	38.8%	44.4%	100.0%

Table 5-16 and Figure 5-20 indicate a trend for the order-age respondents to be in administrative work.

Table 5-16. Percentage and Relative Frequency of Respondents Based on their Nature of Work in Various Age Groups.

Nature of Work	Age Group			Total
	Above 50 years	30-50 years	Below 30 years	
Technical	1.0%	39.4%	22.0%	62.4%
Administrative	3.6%	19.2%	4.4%	27.2%
Clerical	0	5.6%	4.8%	10.4%
Total	4.6%	64.2%	31.2%	100.0%

Design of the Survey

The present sample is a purposive sample of 250 people who ranged from Managing Director to Supervisory Level Grade II and Senior Stenographers. The total employees were 1,650 in number. At the top level, all 42 officers were chosen, sampling here probably would have eliminated some of the necessary information. At the middle level, every second person was chose, and hence a total of 92 persons were sampled out of the

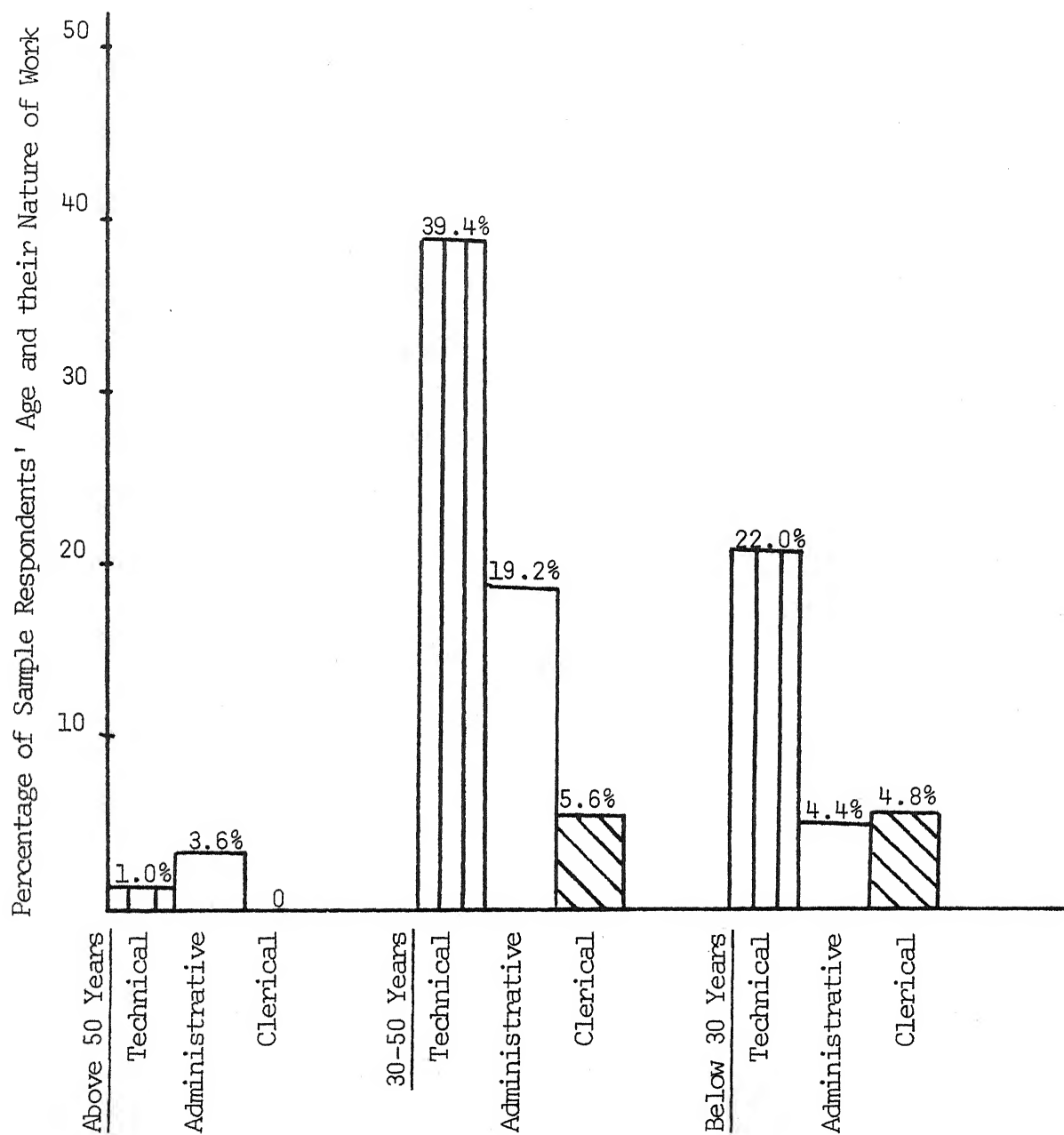


Figure 5-20. Age Group and the Nature of the Work of the Sample Respondents.

total of 167 persons. These numbers were decided arbitrarily. At the lower level, three out of every five persons, or 111 persons out of 265 were selected. At this level the attempt was to represent various roles and positions across different departments. This gives the ability to incorporate in the data-analyses the special positions unique to one department.

The entire population of 250 was divided in three hierarchical levels: Top, middle, and lower echelons of management. These differentiations were based on the pay scale, and on the position or rank in the organization. The respondents were from the four Departments: Commercial, Production, Administration, and Finance. These Departments were divided in Divisions, and further in Subdivisions. Respondents were chosen to represent these various Divisions and Subdivisions of the four Departments.

Data Collection

Data were collected through interview and questionnaire. Questionnaires were, in most of the cases, not given to the respondents, but rather filled out by the interviewer. The questionnaires were filled during office hours, and it took about three weeks in total to collect these data. Interviews were conducted along with the questionnaires. Those respondents who were to be interviewed were informed beforehand. This was arranged through their superiors in the department. First, they answered the questions on the questionnaire, and then the interviewer interviewed them. This gave a checkpoint as to the validity of the information supplied by two different means.

The average time taken to fill out the questionnaire was about 35 minutes, and the interviews ranged from 50 minutes to one and half hours. The average time taken by the interviews was a little over one hour per respondent.

Questionnaire

The study was conducted over a period of three months in 1971. The questionnaires were handed over to the respective respondents by the interviewers. In 98 percent of the cases, the respondents on first chance (on the basis of the random sample) were available. In a few cases, where first-choice respondents were not available, the next person from the total list was interviewed.

In most of the cases the questionnaires were filled in the presence of the interviewer, excepting some cases in which the respondents wanted to have more time. The questionnaire had 20 questions in total. All 20 questions were made for this particular study, as no other suitable, inclusive questionnaire from previous studies was available. The questionnaire was pretested in the industrial complex in the surrounding region. In the original questionnaire, there were 40 questions. We selected questions for the final questionnaire, based on the following rationales. We rejected (1) questions which were left unanswered by a majority of the people on the grounds of evident inapplicability, (2) questions which were not answered by more than half of the respondents were rejected on the grounds that they did not represent an accurate picture of the population, (3) questions in which answer was 100 percent "yes" or 100 percent no, were not accepted as

they were self-explanatory of the existence and/or non-existence of a particular element in the samples, and (4) questions which were lengthy and asked for more than one answer from the respondents, were rejected.

After starting with 40 initial questions, we came down to 20 questions in the final questionnaire. The questionnaire had three parts: (1) Introduction, (2) questions, and (3) personal data question.

The introduction was an informative context for the respondents. It informed them about the research project and the agency conducting it, that their identity would be kept secret, and that the data would be used for no use other than the present study.

Questionnaire Part II had 20 questions which they were requested to answer. The questions were arranged in an order of simple to complex questions, more frequent and less frequent questions, and also from short length to long questions. These questions were assumed to be inter-related as they together constituted the communication system of an organization.

The personal data form contained nine questions in total. There were questions on age, level of educational, and technical qualifications, organizational department, pay scale, number of years in the organization, nature of work, and first language. They were:

I. Age

- (1) Below 30 years of age
- (2) 30 to 50 years of age
- (3) Above 50 years of age

II. Department in Which Placed

- (1) Commercial
- (2) Production
- (3) Administration
- (4) Finance

III. Nature of Work

- (1) Technical
- (2) Administration
- (3) Clerical
- (4) Others

IV. Educational Qualification

- (1) Above graduate
- (2) Graduate
- (3) Intermediate/higher secondary
- (4) High school/senior cambridge
- (5) Below high school

V. Technical Qualifications

- (1) Special training or course
- (2) At graduate level
- (3) At high school level

VI. Level in the Hierarchy

- (1) Managing Director, General Manager, Manager
- (2) Head of the Department, Sr. Engineer
- (3) Sectional Heads, Senior Officers

- (4) Foreman Grade I, Assist. Foreman, Design Engr.,
Assistant Engineer
- (5) Supervisors
- (6) Supervisors Grade II, Senior Accountants, Draftsman
Engineer, Senior Assistant
- (7) Group Leader Grade II/Assistant
- (8) Group Leader Grade III/Senior Stenographer,
Junior Assistant

VII. Pay Scales

- (1) 1,151 to 2,000 Rs. and above
- (2) 1,150-951 Rs.
- (3) 950-951 Rs.
- (4) 750-550 Rs.
- (5) 550-351 Rs.
- (6) 350-251 Rs.

VIII. Number of Years in the Organization

- (1) More than three years
- (2) One to three years
- (3) Less than one year

IX. Language

- (1) Hindi
- (2) English
- (3) Others

The main questionnaire had 20 questions on communication behavior of the members in the hierarchy. The specific variables studied are five: Mode, amount, initiation, function, and direction of message transaction among superiors, equals, and subordinates at the top, middle, and lower levels.

Mode of Communication

There were four questions, as following:

"In an average day how often do you use written or oral methods of communication?"

	10 times	8 times	6 times	4 times	2 times	0 times
Written						
Oral						

"In an average day, what is the proportion of written and oral methods of communication you use?"

	Oral	Written
Top Level		
Middle Level		
Lower Level		

"How often, in an average day, do you bypass channels of communication?"

10 Times
8 Times
6 Times
4 Times
2 Times
0 Times

"In a crisis situation, do you use more?"

Oral Communication
Written Communication

Amount of Communication

There were six questions asked:

"How frequent would you rate your communications in an average day?"

	100%	80%	60%	40%	20%
Top Level					
Middle Level					
Lower Level					

"Do you have frequent contacts in a crisis situation?"

Yes
No

"In an average day, what is the porportion of talks
(communication) about the tasks?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"In an average day, what is the proportion of talks about
things other than task?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"In an average day, how much unwanted communication takes place?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Levels						

"How many times in a day, do your subordinates ask for further information?"

10 Times
8 Times
6 Times
4 Times
2 Times
0 Times

Initiation-Reception of Communication

Following five questions were asked:

"What is the percentage of people who habitually delete information while passing it?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"In an average day, what is the percentage of efforts that you make to seek information from _____?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"What is the percentage of information supplied by you, reported to be insufficient by _____?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"In an average day, what is the proportion of information that you receive?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Bottom Level						

"What is the percentage of information received by you, that is not sufficient?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Bottom Level						

Functions of Communication

Following are the questions developed for studying production and innovation functions of communication in the organization.

"What is the proportion of information that you send,
requiring compliance, in an average day?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"What is the proportion of messages that you receive,
requiring compliance, in a day?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"What is the proportion of messages that you send to people
suggesting new ways of doing the work?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

"What is the proportion of messages that you receive from people suggesting new ways of doing the work?"

	100%	80%	60%	40%	20%	0%
Top Level						
Middle Level						
Lower Level						

Direction of Communication

Four questions were developed for studying the direction of communication.

"How many times, on the average day, do you use the formal channel (top down or bottom-up) of communication?"

10 Times
8 Times
6 Times
4 Times
2 Times
0 Times

"Do you think that communication systems (formal and informal) in the organization are _____?"

	Formal	Informal
Effective		
Ineffective		

"What proportion of information in a crisis situation would you want to come to you through formal and informal channels?"

	100%	80%	60%	40%	20%	0%
Formal Channels						
Informal Channels						

"What is the percentage of people who consider informal systems as efficient in diffusing various types of messages?"

	100%	80%	60%	40%	20%	0%
Factual						
Directive						
Suggestive						
Others						

INTERVIEW

The interview had two parts. Part I consisted of questions specifically on the technology of the departments. There were seven questions in total. These questions were answered by all respondents.

Part II consisted of a selected percentage of the sample who answered questions relating to communication and organization. Interview Part II was conducted with 11.6 percent of the respondents (Table 5-17).

At the top level, we interviewed 4 persons out of 42 (9.5%), or 1.6 percent of the total sample of 250. At middle levels, we interviewed 11 persons out of 97 (11.3%) respondents, or about 4 percent of the total respondents interviewed. At the lower level, we interviewed 15 out of 111 persons (13.5%), or 6 percent of the entire sample of 250 respondents.

Table 5-17. Respondents Interviewed.

Levels	No. of Total Sample	No. of Sample Respondents Interviewed	Percentage of Sample Respondents Interviewed (250)	Sampling Rate of Respondents Interviewed
Top	42	4	1.60%	9.5%
Middle	97	11	4.0%	11.3%
Lower	111	15	6.0%	13.5%
Total	250	30	11.6%	

Interview Part II attempted to supplement the information provided by the questionnaires, and to get some feel for the overall organizational climate as to how the communication systems are viewed by members, and what changes they want in the various subsystems of the organization.

Interview Part II was structured to the extent that it included answers from respondents to certain questions. Following are some of the categories of questions that were put by the interviewer to the respondents.

1. What does communication mean to you?
2. How would you rate employee relations in the mill?
 "Fairly Good," "Poor," "Need to be improved."
3. Do you think people at various ranks require more information?
4. Which type of information is more required?
 "Factual," "Directive," "Suggestive," "others."
5. What are the various channels through which you think information should come?
 "Bulletin Boards," "Supervisors," "Grapevine,"
 "Official Memo," "Company Publications."
6. How are communication systems in your organizations?
 "All written messages," "More written than oral,"
 "About 1/2 written and 1/2 oral," "More oral than written," "All oral messages."

7. What is the locus at which decisions are made?

"At all levels of departments"

"Policy; encompassing the total organization at the top and delegated to levels below"

"Policy of particular nature in the respective department and delegated to levels above and below"

"Most of them at top"

"Only top"

8. Is the emphasis in the organization more on the individual or on the group?

"Group," "Individual"

9. Is there a high degree of flexibility in who talks to whom within the organization?

"No flexibility"

"Some flexibility"

"Complete flexibility"

10. Where is technical knowledge and experience in professional fields used in decision making?

"People at all levels of organization"

"People at all levels whose job has relevance in the decision"

"Only top-level people"

"More staff people than line"

Most of the questions were multiple choice question; exceptions were questions #1, #3, #4, and #7. This inquiry was concerned to probe the communication process. For that purpose, both open-ended and multiple choice questions were asked. Interviews took somewhere from 50 minutes to one and half hours. All comments, other than those asked, were recorded, and the general impressions of the interviewers were also recorded, based on the following factors:

1. How happy (satisfied) he appears to be at work: Measured and observed by his use of positive/negative terms, in describing work, work contents, work relationships, future plans to stay or change.
2. Did he have an objective way of thinking? His estimates are not exaggerated, or he supports them with facts.
3. Is he hard-pushing and achievement-oriented? He talks about the activity in his department, how well or poorly they perform. How he as a worker is conscientious, whereas others are lazy, etc.
4. How social he is? He has friends at all levels. His subordinates are not afraid of him; they come to him without hesitating. He can go to his superiors anytime, about task as well as personal problems.

The interviews were conducted at work, outside work, during lunch-time or coffee breaks, and some of them were conducted at the respondents' homes.

Compilation and Processing of Data

The data was tabulated for each question. Some were in percentages; others were averages. Data were cross-tabulated in order to

find existing relationships. As this is an exploratory study, no hypothesis were designed to be tested. The methodology was relatively simple. Data simply were tabulated and percentages or means were found and then the data are cross-tabulated. Not all variables had numerical values, so correlation was not possible. It was decided to cross-tabulate the data, and on that basis, draw inference.

Interview data was also assessed. Part I of the interview was assessed by the author. The attempt was to establish the general picture of technology employed in various departments. The questions were assessed on the basis of their contents, and relevance to the nature of work of the respondents. Respondents were shown the continuum of technology (Figure 4-8), and asked to place their particular department in the respective categories.

No numerical value was assigned to responses on technological questions. Instead, a general picture emerged from the respondents' answers to questions plus their background data on the nature of work, professional training, language, age, and department, and responses were assessed and assigned to categories on the technology continuum.

Interview Part II was also assessed. Measurement was done first by the respondents themselves. The evaluation measurement scheme was given to them by the researcher. Then the researcher did similar evaluation, based on the same measurement scheme. The measurement was rated on a five-point scale:

0-25	Very poor	No targets, no goal, purposelessness.
25-50	Poor	Poor morale, little understanding.
50-75	Average	Information of various types, accurate, etc.
75-100	Good	Careful, time consideration, relevant information.
100	Excellent	Perfect environment to aid the achievement of goals through communication; no conflict, adequate communication.

CHAPTER VI

FINDINGS

Interview Results

The purpose of the present chapter is to report the findings of the study. A comparison is made between the Production Department and other three Departments, based on their level of complex technology. First in the chapter, a discussion of the major results from the interviews is given. The results from the interviews are also indicative of the results of the questionnaires. In general, the interview provided data about the general communication environment in the organization, and the differences and similarities among the departments on technological variables. Secondly, the chapter discusses findings about the individual variables of communication: Mode, amount, initiation, direction, and function of communication.

When asked, "What does communication mean to you?" the top level answered in a very consistent manner. Following are some of the answers given:

"It is the act of passing information from one to another."

"It is an activating of management to keep the employees informed from time to time about decisions made and action taken."

"It is establishing contact."

"It is a process that involves people at either end."

At the middle level, replies indicated a number of misgivings and misunderstandings as to the meaning of the term; also found were differences in interpretation between the top- and middle-level managers. Some of the more typical answers are:

"The ease with which ideas and/or intentions can be clearly conveyed from one to another."

"Getting to know what our existence is. Communication really is a tricky word. It means how you have faired and also what are your potentials."

"It is a process which has motivational as well as economic content. When I receive something, that means some news has been ordered in a manner--and that the other party involved is being paid off in some manner."

"Communication is what keeps groups and individuals together. In essence [it is] the lifeblood of our organization."

The same question, when asked of the lower level, was answered in an abstract way, and many did not really know how to put it in words. Many answered in a very personal way, so it was not possible to get a clear-cut definition. The interviews showed that many of the respondents think that information gets distorted. The typical view was something like the following: "I feel communication is bad in our organization." Less than another 10 percent found no problem with communication.

Another question asked was: "How would you rate employee relations in the mill?" The results are shown in Table 6-18. The highest percentage of needed change in the system was indicated by the top level,

Table 6-18. Ratings on Employee Relations.

Responses	Hierarchical Level		
	Top Level	Middle Level	Lower Level
Fairly Good	33%	50%	52%
Poor	23%	40%	42%
Need Improvement	44%	10%	6%
	100%	100%	100%

whereas the middle and lower levels show very little necessity for change in the system.

A question was asked about the various channels through which respondents would like information to come to them. Table 6-19 shows the responses.

Table 6-19. Channels of Information.

Channels	Hierarchical Level		
	Top Level	Middle Level	Lower Level
Bulletin Board	0	10%	5%
Supervisors	50%	35%	45%
Oral Grapevine	20%	30%	40%
Official Memo	30%	25%	10%
Total	100%	100%	100%

Verbal channels of communication (especially from supervisors) are preferred at all levels.

The question was asked as to how varied and interesting the communication systems are in the organization. The top level reported

that communication needs simplification. They also indicated that much more communication is needed among various departments. Following are some of the answers:

"Communication system is perfect and the most rational one."

"The company is already doing a research on communication in the Production Department. Company needs at the present require that communication at the lower levels should be improved."

"I mostly employ informal communication while dealing with subordinates in technical work. But I use formal channels when I talk about administrative matters."

"I do not mind skipping levels in communication, and I am quite informal even in interdepartmental communication. Also, I am less formal with Production Departments than with Finance and Commercial."

"I do not mind skipping levels. My subordinates do not mind if I talk directly to their subordinates."

"Communication is fairly o.k. But acute human relations problems face us."

It appears that communication with subordinates and equals, both are quite informal. The receiver makes a difference, in terms of the department to which he belongs. It is the nature of work among technical people that requires closer and more informal communication among various levels.

At the middle level, the picture seems to be a very pessimistic one. Some of the responses are as follows:

"Communication is bad, and could not be worse. Indeed, it has never been worse. In my association with the Company, I am surprised to find that communication at all levels is so vague and uncertain."

"The top executives just seem unable to deal with the needs and interests of all people below them. Memos are sent. No changes even get reported by higher levels. I did not know about a few big changes until recently. I was eventually informed by an outsider, then by the grape-vine."

"Communication can and must improve. Good communication starts at the top. If the top executives do not understand this point, then the actual messages and instructions will become even more distorted and meaningless lower down."

"Greater authority should be given to the line people, to take up their communication tasks, which is to keep the people in touch with what is happening."

"Communication has been discussed so often at meetings, etc., that I consider management and employees to be too blasé about it. Discussions on communication tend to be frivolous. One of the reasons for poor communication is that many people do not have the understanding to get in touch with other people."

At the lower level there is great dissatisfaction and frustration among employees regarding the effectiveness of communication system. Some of the responses are:

"I personally feel [a need for] strengthening the line of command and encouraging all levels to pass information promptly. At the moment, the actual line of authority is very unclear."

"Communication has deteriorated during the last two years. It is difficult to reach the top executive. It appears as if they need someone to help them and ensure that decision-making is prompt and effective."

"Because of the errors involved in the process of spoken communication, on which many people fall down, I would advocate that memos should be used more effectively between management and employees."

"Communication will always need improvement because people are naturally curious as to what is going on in their working environment."

"The differences of status between different levels of authority has created a big communication gap, and hence, scarcity of information at the points where it is needed."

"The actual message is not more important, it seems, but the method of communication has been given so much importance. The concern is not that the message is to be conveyed. More time is unnecessarily wasted on which method be best. Method should be determined by the nature of message."

"Good communication is lacking at all levels. I can get information from sources that I should not have access too."

"Communication is not good. People at the higher levels think that communication and morale will improve simply by sending a letter or making a telephone call to put something right. There is no conception of teamwork and the improvement of communication by efforts."

The following points from the interview results seem very important for the study:

1. Almost unanimously, at all levels, there is felt to be a substantial room for improvement in communication systems.
2. There seems to be high reliance on verbal communication in the organization.
3. There was emphasis on the damaging effects of having to rely on informal, haphazard, and grapevine channels.
4. There was a reiteration of the overriding responsibility of the top level to ensure a more satisfactory system of communication.
5. There was felt to be a lack of interdepartmental communication.

Questionnaire Findings

Five variables were studied. Following are the results for each of the variables.

Mode

Communication modes studied were oral and written. On the whole, it seems that there was more oral communication compared to the written

mode of communication in the organization.* A slight difference between Production Department and the rest of the three Departments was found (Table 6-20).

Production Department shows the highest use of oral modes compared to the other three Departments. At the top level, it seems that executives use mostly oral communication in their contacts. A study by Burns (1954) indicates that 80 percent of the time of higher executives was spent in talking.** At the top level, all four Departments show the tendency of using more oral than written communication. The difference between Production and the other departments seems to be based on the type of work with which each are involved. Production requires much decision-making on the spot. Writing a memo may take too much time. Hence, decisions are made and later reported for record-keeping.*** Also the Production Department's operations offer require

*It has been said that a bureaucratic system is marked by the presence of much paperwork and red tapism. But the present study shows that the oral mode was at least equally important in the organization.

**Similar results are provided by Stogdill and Shartle (1955) in their study of 470 Navy officers who spent 59.6 percent of their time in verbal contacts with people. Carlson (1951), in his study of 12 German top executives, shows that they averaged 70 percent of their time in verbal communication. Ulrich, Booz, and Lawrence (1950) estimated that roughly 60 percent of department heads' time was spent in talking.

***It has been said many times that technical and engineering personnel are more inclined to give orders verbally than in writing. They seem to prefer greater freedom and use of judgment on the spur of the moment, resulting in higher use of oral communication. Pelz (1956) found that government scientists tended to insulate themselves from central and departmental services staff by such simple devices as using a telephone. So oral mode is used to avoid many situations.

Table 6-20. Mode of Communication at Various Hierarchical Levels.

Department	Hierarchical Level								
	Top Level			Middle Level			Lower Level		
	Mode of Communication		Total	Mode of Communication		Total	Mode of Communication		Total
	Written	Oral		Written	Oral		Written	Oral	
Commercial	40%	60%	100%	50%	50%	100%	40%	60%	100%
Administration	45%	55%	100%	45%	55%	100%	55%	45%	100%
Finance	40%	60%	100%	60%	40%	100%	55%	45%	100%
Production	10%	90%	100%	30%	70%	100%	20%	80%	100%

a decision by the person immediately superior. Oral communication is used instead of going through the chain of command and getting matters approved by higher officers. Oral use is so prevalent because of the fact that the Production Department has the tallest hierarchy and the largest number of employees. If all directions were only in black and white, one could imagine the slow action in the Department. Whereas in the other three Departments, the structure is not so tall and they have a smaller number of employees. So verbal is used about equally along with written. In general, at the top level there is relatively less written communication simply because of the fact that oral communication demands so much of top management's time. The three Departments show about equal time on written and oral. This is due to the fact that these Departments use a simpler technology, matters are more certain and exceptions are fewer, and work is not as highly mechanistic as production technology. So individuals do not necessarily face situations in which they have to give directions for action. The three departments keep the system going, they impart stability as they administer, project, plan, and decide future course of action. Hence, the opportunity and occasion for verbal contacts are not so many as in Production.

The middle and lower level results are similar to the top level. The Production Department again shows a high use of verbal method, and the three Departments show roughly an equal use of both written and oral.

It appears that the technical nature of work, belonging to a profession, and the fact that most of the employees at all levels of the Production Department are engineers or technical personnel, have

some impact upon the mode of communication used.

The Commercial, Administration, and Finance Department differ not only due to a simpler technology, a flatter hierarchy, and a lesser number of people, but also because of a different age structure. The Production Department used so much oral communication, not only because of complex techniques and mechanization, but also due to comparatively younger people in the Department. In the Production hierarchy from the top to the lower echelon of management employees, ranged from 45 years of age to 22 years. In the other three Departments, age ranged between 60 years to 28 years.

In the ARC organization, communication is an essential work tool. Communication methods, both oral and verbal, were equally used by the three Departments, while the Production Department used mostly the oral method.** Both oral and written forms are important for an organization.***

*Jacobson and Seashore (1954) say that it is useful to see communication as a work tool that is important for the day-to-day operations of an organization.

**It appears that the size of the Production Department has not proved a handicap to effective communication. Baker (1948) found that in a study of 40 manufacturing companies, respondents considered size as one of the great handicaps to effective communication. Respondents stressed the need for reliance upon the written word, and that the larger the unit, the greater the problem in insuring that verbal communication be accurate and undistorted.

***Habbe (1952), in two plants, found that 60 percent of the respondents reported a written information source and 40 percent reported oral. He concludes that "it would be a mistake to make too much of a vote that divided (roughly) 60% to 40%. The main conclusion is that both the oral and the written forms are important" (pp. 36-37).

Amount

Communication amount was measured in terms of frequency and duration of contacts among respondents. The general picture that emerges is that respondents see communication as a very important work tool. Not surprisingly, almost 80 percent of the respondents agreed that during a crisis situation, the amount of communication increases.

When asked about the amount of communication related to task, it was found that both task and non-task related communication exists among respondents, and were of considerable importance. Table 6-21 shows the amount of task-related communication.

Table 6-21. Task-Related Communication.

Department	Hierarchical Level			Total
	Top Level	Middle Level	Lower Level	
Commercial	32%	30%	38%	100%
Administration	20%	27%	53%	100%
Finance	28%	32%	40%	100%
Production	27%	42%	31%	100%

Communication among top-level respondents throughout the organization was low. The top-level talks mainly to the level below in everyday contacts in a work situation. At middle-level, it was found that the first three Departments were again low on the amount of communication. The middle-levels, Cartwright (1959) points out, serve as connecting points between top- and lower-levels. But the three Departments do not necessarily hold to this common-place notion. The Production Department shows a little higher communication at the middle-level.

The Production Department in the ARC organization has the largest number of employees, and the middle-level here has the largest number of respondents. So maybe the higher volume is a result of this feature. The techniques and the nature of work are more complex, changing, and uncertain. The middle-level is constantly sought by lower levels for direction, and by higher levels for reporting and evaluation.*

At the lower echelons of management, the Production Department shows a relatively lower amount of communication transactions, as compared to a slightly higher percentages in other three Departments. As noted previously, the Production Department employs a relatively higher level of mechanized work tools and level of technology. Hence, the amount of direct supervision seems to go down considerably,** whereas the other three Departments show a relatively higher volume of communication related to task. These Departments do not employ a large number of people, a high level of complex technology and mechanized techniques, as Production does. Hence, there is need for a close, direct, and vertical supervision, resulting in a larger volume of task-related communication.

Table 6-22 shows the amount of communication which is unwanted, and not necessarily related to work. The top-level reported a lower

*It has been suggested by many that it is at the middle-level that most communication related to task goes on. The middle-level gets the work done in the organization. Janowitz and Delaney (1957) concluded that "In a public bureaucracy, where top management spent a significantly larger proportion of total time in public relations activities and maintaining contacts with external agencies, in contrast to lower-level officials, who really 'ran' the organization day-by-day."

**See Faunce (1958), Guest and Walker (1957), and Blau (1957).

Table 6-22. Unwanted Communication.

Department	Hierarchical Level			Total
	Top Level	Middle Level	Lower Level	
Commercial	25%	45%	30%	100%
Administration	30%	50%	20%	100%
Finance	20%	50%	30%	100%
Production	10%	40%	50%	100%

degree of unnecessary communication. Similar results were found among the top levels of all four Departments, in their communication about task.

At the middle-level, more unwanted communication is reported as compared to the top-level. All four Departments report similar tendencies. There are small difference between the Production Department, with its sophisticated technology and complex mechanical means of getting the work done, and the other three Departments employing relatively less complex and simpler techniques of work. At the middle-level of the Production Department, most task-related communication occurs. Many a times no communication is necessary for job performance. The other three Departments also show a higher rate of unnecessary communication at the middle-level. At this level, executives and officers play the role of acting as a go-between for the top- and lower-levels. At this level there should be a larger volume of communication interactions. Hence, the liklihood of unwanted and wasteful contacts is increased also. There is also a lot of horizontal communication going on within and outside the Departments. High interdepartmental

communication at the middle-level adds to the total volume of communication contacts, but may not necessarily add to the volume of task-related contacts.*

At the lower echelons of management, it seems that the Production Department shows a higher percentage of unnecessary communication, compared to the other three Departments. The Production Department at the lower level reported a lower amount of task-related communication, compared to a slightly higher amount by the Commercial, Administration, and Finance Departments. In the present case, Production reported a higher amount of unnecessary communication, whereas the other three Departments report a relatively lower amount of unwanted communication. This may be attributed to the fact that in the Production Department the task involves greater risk and is more complex. Hence, closer contact among workers emerges. These contacts extends beyond work situations.** These lower-level employees may still report a large volume of interaction, but they may not necessarily be only work-related.*** The percentage of unnecessary or non-task-related messages

*It has been said that the greatest amount of communication takes place at the horizontal level in organizations. Observation shows that there is a very substantial increase in the proportion of time spent in interaction that is devoted to equals or peers, as one moves downward in the rank system. Richardson and Walker (1948) and Dalton's (1959) anecdotal account investigate horizontal communication and volume of business transacted.

**For a detailed account of how these contacts are widened, see Schein (1965, Chapters 3, 4, and 5).

***Simpson (1959) found in his study that 43 to 76 percent of contacts among foremen at lower levels were among peers, and that a high percentage of horizontal communication and a large volume of informal communication is at the lower level. This high volume of

seems higher at lower level in the Production Department. Blau (1957) found that increased mechanization results in less supervision, and less task-related communication from supervisors to workers. In a production unit, the supervisor's role is only that of expeditor. Likewise, in the ARC organization the work is mechanized, resulting in a lower need for direct and task-related contacts, among employees of the production unit. One is lead to believe that this vacuum is filled with non-task messages, which satisfy social and other needs at work.* The other three Departments show that the amount of unwanted communication goes down as they are involved in a less complex, more certain, and less mechanized techniques, compared to the Production Department. This seems to contradict results of some of the earlier studies, cited here. Faunce and Guest and Walker found high mechanization results in lower communication contacts, but the present data do not support this point. Instead, it has been found in the three Departments with the lower degree of mechanization or complexity of technology, have lower corresponding amounts of communication. The three Departments involving simpler work techniques do not necessarily differ in the amount of

informal communication is essential to get the job done.

*Faunce (1958) found results quite opposite to those of Blau (1957). He found that increased mechanization and technological complexity result in more supervision, greater direct contacts, and less non-task contacts. Complex techniques of work, uncertainties of operation, and greater risk of the production units, lead to increases in frequency and seriousness of machine breakdown, requiring more vertical, direct, and task-related communication contacts at the lower levels.

Guest and Walker (1957) also found that high mechanization results in a low need for vertical communication about the task.

communication, but do differ from the Production Department in the volume of unnecessary communication at the lower echelons of management. For the Production Department, Blau's (1957) finding holds that the higher the level of mechanization and technological complexity, the lower the volume of task-related communication. The volume of unwanted (horizontal, non-task) communication seems to go up, to fill the vacuum created by a lack of vertical communication, which is mainly task-related.

Initiation

Communication-seeking and receiving are the two aspects of initiation which are studied here. Seeking is who initiates messages, and receiving is the opposite of initiation. Both initiation and reception are essential to communication behavior. In general, it was found that there seems to be a tendency among all respondents to delete information from messages that was contrary to their own opinion. This was done most at the middle-level, with a slightly lower rate at the top, and lowest at the lower levels.

Another aspect studied, was whether messages sent from one source to another, in general, are viewed as sufficient or not. It was expected that this general data will provide some clue to the level of exchange of information across levels. It was found that at the top level, respondents reported that messages sent to their superiors and subordinates are more than sufficient, but what they demand from them is insufficient. So there exists a disparity in the rate of information-exchange.

At the middle-level, it was found that respondents reported that information supplied to subordinates is sufficient, but superiors always complain that it is insufficient. As far as the receiving of sufficient information was concerned, it was reported that superiors did not supply sufficient information, whereas subordinates did supply sufficient information.

At the lower level, in general, it was found that respondents complained that they do not get enough information from superiors, but subordinates do supply sufficient information. They perceive that the initiation of messages is quite adequate, but they do not get feedback from superiors.*

Table 6-23 shows much effort respondents devote to seeking information, and how much they receive in return from other sources.

All Departments report a very high rate of message initiation at the top level. The Production Department shows the highest rate of initiation, compared to the other three Departments. The highest rate of initiation of messages by the Production Department can be attributed to the fact that it is the technical nature of the work, which requires all levels to be in constant touch and aware of new developments. Hence, top officials often take rounds and see workshop conditions. If a new technique is used for the first time, they observe it, and direct operations. This phenomenon is not very evident in the other three Departments. The highest initiation role is due to technical

*Similar results are reported in the study by Burns (1954) on English executives, by Whyte (1948) in his study of the restaurant industry, and Argyris' (1957) work on organizational and personality.

Table 6-23. Initiation and Reception of Messages.

Department	Hierarchical Level							
	Top Level		Middle Level				Lower Level	
	Initiation	Reception	Initiation	Reception	Initiation	Reception	Initiation	Reception
	Total	Total	Total	Total	Total	Total	Total	Total
Commercial	80%	20%	100%	60%	40%	100%	25%	75%
Administration	85%	15%	100%	55%	45%	100%	20%	80%
Finance	75%	25%	100%	50%	50%	100%	22%	78%
Production	95%	5%	100%	70%	30%	100%	22%	78%

training, nature of operations, and the complexity of the technology.

The Production Department involves a level of technology more complex, more uncertain, and highly situational. Hence, new situations have to be met.* Top management initiates more messages, as they seek information about the state of affairs. The present finding is supported by Simon, Smithburg, and Thompson (1950). When communication contacts are made between individuals of different status, communication more easily takes place from the superior to the subordinate, than the other way round.

The results here are also similar to results found in a studies by Guest and Walker (1958), and Blau (1957). The level of mechanization results in less and less direct communication contact. At the same time, it seems to increase one-way communication mainly from high levels to lower levels.** Finally, the top level does not seem to show that those who send more, receive more communication.

At the middle level, there seems to be more balanced rates of initiation and reception. The three Departments indicate that the rates of sending and receiving information about match. The middle-level, is mentioned previously, is where most communication takes place. This

*It was reported earlier that the top-level in general reported a relatively lower amount of communication activity. The reception of messages by the top-level is reported as low and Production reports the lowest reception. This vacuum is filled by more seeking of information.

**A study done by Donald (1959) indicates almost parallel rates of initiation and reception. Landsberger and Miller (1957) also report closely balanced rates of initiation and reception.

This level acts as a link between top- and lower-levels. Hence, they send the most, and get the most. At this level, officers are as much concerned about getting information from rank-and-file workers as they are about filtering the information downward that is sent by higher management. The parallel rates at the middle level may also be explained by the fact that it is at the middle echelons that a lot of horizontal communication takes place. It was shown by one study* that the inter-departmental communication among equals in various departments has highly reciprocal tendencies.

The Production Department respondents, however, present a markedly different picture. They show disparity in their exchange of information. They seem to send more than they receive.

As noted earlier, in the Production Department the level of mechanization or technology is different from the other Departments. The complex technology requires more supervision and direct communication.** More messages get initiated, as the superiors seek information and also direct the work. The status difference between the senders and receivers restrict the sending of messages from bottom to higher levels, and so reception at the Production Department is very low. Still another reason for a low reception rate could be, as shown by

*Landsberger and Miller (1957) indicated in their study of two factories, producing similar products, that parallel rates of initiation and reception existed among equals when they communicate.

**Faunce (1958) found increased mechanization results in more vertical communication.

studies,* that the level of technological complexity and rate of communication from subordinates to superiors are inversely related. In other words, subordinates in the face of technological sophistication, learn to handle situations and seek less vertical communication,** hence, superiors' reception rates are very low.

At the lower-level, very high reception rates and very low initiation rates were found. Parallel situations are found among all four Departments.

Two important findings are: as one moves from higher to lower ranks, the amount of upward communication (from lower ranks) decreases.*** Secondly, the greater the status difference between two individuals who are communicating, the greater will be the likelihood of communication coming from superiors to subordinates, rather than vice versa.****

*Blau (1957), and Guest and Walker (1958).

**The assumption in the study for comparing the Production Department with the other three Departments was based on technological complexity, that results in differences in communication behaviors. It seems that the Production Department, due to uncertainty, exceptions faced, mechanized work, and changing plans, ought to show a higher rate of communication activity in general. But the amount of communication, and the effectiveness of the formal system of communication, have not yet shown results very differently from other Departments. This might become more clear if study were done on a comparative basis of more than one organization in a similar industry.

***Simpson (1959).

****Simon, Smithburg, and Thompson (1950). A study which negated the above-mentioned state of affairs was done by Habbe (1952). He found that in two plants, that despite barriers of status, it is possible to achieve upward communication, given enough effort. Communication barriers within the hierarchical structures of the organization may be surmounted.

There is another argument presented by Blau (1954) that the competence of individuals determines whether they initiate more, or receive more, messages. Those who were more competent, received more communication, but they did not initiate more contacts than others. Many who were less competent received fewer communication messages.

Direction

Communication direction is studied in terms of dominant flows like top-to-bottom or bottom-up direction (vertical), and communication flowing sideways among equals (horizontal). Vertical direction is here conceptualized as essentially a formal channel, and horizontal is essentially an informal channel of communication (including rumor and grapevine communication).

Formal or vertical channels during crisis situations were reported by all departments as a main source of information-seeking and receiving. Respondents reported being able to trust information coming from formal channels more than from informal channels, across all levels. In a crisis situation respondents rely upon formal channels of communication. Barnard (1937) noted that for routine communication, authentication is not necessary. But in times of crisis, explicit authentication becomes necessary. Necessary means used are written communication, or letterheads indicating the name, position, and the title of the communicator, so the status system becomes very important.

*It has been said that the formal system and one's position or rank in the hierarchy are not the only reasons why people seek formal channels in a crisis. In Weber's analysis, even though he does not state the point directly, the bureaucratic performance has some

Table 6-24 shows how effective or ineffective formal communication systems are in the ARC organization.

There does not seem to be important differences between the Production Department, when compared to the other three Departments, on the effectiveness of the formal, vertical communication system. Communication is seen as very effective top-down or bottom-up, among top-level executives. All four Department executives report that the formal system of communication is more effective than ineffective.* At the higher levels one finds more vertical contacts than at lower levels. So effectiveness in the formal system may be a result of the fact that it is the mainly-used channel by the top-level.**

At the middle and lower levels of management, the communication system which is formal is also seen as highly ineffective. The middle and lower-echelon respondents report a low degree of effectiveness of the formal communication system.*** As noted earlier, studies show

relationship to increased access to persons, information, and instrumentalities. Also it has been observed that other factors remaining constant, as a participant's length of time in an organization increases, he has increased access to persons and information. Also, a person's location in physical space and in social space effects his contacts with people.

*It has been suggested that top-level people are also the most conservative and criticism of the company amounts to self-criticism. Hence, they always maintain that nothing is wrong with the formal system, it is very efficient, and very considerate to all others below them. The positive responses may only mean a maintenance of the status system a desire to believe that all is well.

**Simpson (1959) found that communication between higher levels is more vertical than horizontal.

***Traditionally, bureaucratic communication has been characterized by its predominantly one-way flow from superiors to subordinates without

Table 6-24. Formal Communication System.

Department Systems	Hierarchical Level							
	Top Level		Middle Level				Lower Level	
	Effective	Ineffective	Total	Effective	Ineffective	Total	Effective	Ineffective
Commercial	66%	34%	100%	25%	75%	100%	25%	75%
Adminis- tration	66%	34%	100%	20%	80%	100%	32%	68%
Finance	67%	33%	100%	30%	70%	100%	30%	70%
Production	57%	43%	100%	27%	73%	100%	30%	70%

that higher levels seek more vertical contacts compared to horizontal contacts of lower levels. Maybe here the middle and lower-levels represent an illustration of this phenomenon. It is at these two levels that most work gets done; they probably bypass formal channels of communication.*

Donald (1959) found that as the size of the organization increased, there were increases in the rate of vertical communication. Higher to lower communication increased, however, the rates of upward communication from lower echelons to higher were related inversely to the size of the organization.

Barnard (1937) presaged those empirical findings in his speculations about the relationship of the size and the use of formal and informal techniques. He posited that the burden on formal channel is increased when technology requires increases in size. Important here is the notion of overload. The formal channels carry most of the new burden, and hence are not acting efficiently. Distortion, delays, deletion, late arrival, etc. occur, which further result in ineffectiveness of formal channels of communication.

adequate feedback. Communication is restricted to formal channels, which usually is the chain-of-command. This often overloads the lines of communication, delaying and distorting it in the relay process. Middle and lower management levels are plagued by this problem, and perceive that formal communication is inadequate and ineffective.

*The fact that the communication system is reported to be ineffective by middle and lower levels could also be attributed to the tendency for individuals to use rewarding channels again and again. Hence, the formal system may have been proven non-rewarding, resulting in the greater use of informal channels. For a detailed account, see March and Simon (1958, p. 167).

An information gap emerges. Lack of information on the one hand, and information overload consequences on the other, result in dissatisfaction with the formal system of communication. Hence, it appears due to the large size of the middle and lower levels, that the vertical rate of communication increases on the whole. But formal channels tend to prove ineffective as they take a slow and deliberate process of decision. Formal channels are tied very closely to the status system, that establishes authoritativeness of communication, so that lower levels cannot disregard them.*

The effectiveness of the formal communication system does not seem to vary on the basis of technological complexity. The Production Department shows similar results to the other three Departments regarding the perceived effectiveness of the vertical system of communication.

Table 6-25 shows how informal or horizontal systems are viewed.

The two groups that are compared on the complexity of their technology do not vary in their communication patterns. All four Departments show rather similar results. On the whole, it seems that the informal or horizontal communication** is more effective than formal communication system. All three organizational hierarchical levels

*Donald (1959) found that even though vertical communication increased with increased organizational size, the rates of lateral communication among rank-and-file members remained about the same.

**It cannot be too strongly emphasized that horizontal relations among peers in management constitute a dimension of organization communication behavior long neglected and probably as important as vertical relationships among members.

Table 6.25. Informal Communication Systems.

Department	Hierarchical Level							
	Top Level		Middle Level				Lower Level	
	Effective	Ineffective	Total	Effective	Ineffective	Total	Effective	Ineffective
Commercial	66%	34%	100%	75%	25%	100%	66%	40%
Administration	67%	33%	100%	80%	20%	100%	55%	45%
Finance	66%	34%	100%	70%	30%	100%	69%	39%
Production	72%	28%	100%	80%	69%	100%	69%	39%

report a high degree of perceived effectiveness of the informal communication system. The top-level respondents report that the informal communication system is very effective. They also report a very effective formal communication system. Davis' (1953b) study of the Jason Company has implications for the present study; like the Jason Company, the ARC organization has formal and informal communication systems that are jointly active, or jointly inactive.

The middle and lower-levels reported that the formal system was ineffective, but that the informal system is very highly successful. This finding is contradictory to Davis' (1953) Jason Company. The results indicate that where formal communication is ineffective, the grapevine (informal system) rushes into fill the void. The present results at the middle and lower-levels seem to support the assertion made by writers for the National Industrial Conference Board, that the grapevine thrives when other channels of information are closed (Habbe, 1952, p. 34).

Informal or lateral communication are essential to the proper functioning of the vertical system.

Function

Communication in the ARC organization performs two basic functions: (1) production, or getting the work done, (2) innovation or change to new ways of job performance. Table 6-26 shows the results.

It appears that results here are very similar to those found on the initiation of messages. In general, the initiation and reception rate of production-related messages are parallel at the middle-level,

Table 6-26. Production Function of Communication.

Department	Hierarchical Level					
	Top Level		Middle Level		Lower Level	
	Sent	Received Total	Sent	Received Total	Sent	Received Total
Commercial	70%	30%	100%	50%	50%	100%
Administration	70%	30%	100%	40%	60%	100%
Finance	75%	25%	100%	70%	30%	100%
Production	85%	15%	100%	70%	30%	100%

but at the top and lower-level, they indicate disparity. At the top-level, all Departments do not use communication as a basic work tool. The messages sent are high in proportion, while those received are low. Technology is not a basis of different levels of communication activity. It is at the top level that work is evaluated; it is at the top that policies, plans, and decisions are made. Hence, failure in meeting deadlines and reaching the target are seen as failures of top-level planning and policies. Had technology been the reason, the three departments should report different results, but it is the hierarchical position, the status system, and the norms which determine responses.

At the middle level, it was found that in the first three Departments there were equal rates of reception and initiation. Communication seems to function in getting the job done, in the sense that it conveys task-related messages from one source to another. In the Production Department communication serves as a job tool, but in terms of receiving job-related information, it is not so vital. As mechanization gets complex, the level of direct supervision is lowered and the level of information-seeking by subordinates is lowered too. Hence middle echelons in a technologically-complex department like Production indicate initiation of task or job-related communication is very high. The function that communication fails to provide in task performance is that of feedback.*

*Feedback is the process by which messages are sent to the original sender about certain state of affairs resulting from the initial message by the sender. For production or job performance, it

At the lower echelons, one again finds similar results in the four Departments. Technological differences at the lower level do not matter much when it comes to the production function of communication. All Departments report that they receive very high amounts of messages related to getting the job done, and they initiate very few. This is similar to what was found among lower-level respondents regarding initiation tendencies. They reported that they receive much more than what they need, but they send very little. Again, as one moves down from higher to lower ranks, the amount of horizontal communication is increasing.*

Table 6-27 indicates the rate of innovative messages at the top, middle, and lower echelons of management sent to various levels; Table 6-28 shows the rate of innovative messages that they receive from various levels.

Table 6-27. Innovative Messages Sent.

Department	Hierarchical Level			Total
	<u>Top Level</u> Sent	<u>Middle Level</u> Sent	<u>Lower Level</u> Sent	
Commercial	20%	30%	50%	100%
Administration	27%	27%	46%	100%
Finance	28%	32%	40%	100%
Production	20%	45%	35%	100%

is important that the communication system is strong in feeding back the results, failures, consequences, and opinions of the initial receiver to the sender (who originated the message). It seems that communication at the middle level in the Production Department is one way, but does not report effectively the receivers' viewpoint.

*It is easier for communication to flow from superiors to

Table 6-28. Innovative Messages Received.

Department	Hierarchical Level			Total
	Top Level Received	Middle Level Received	Lower Level Received	
Commercial	18%	35%	47%	100%
Administration	29%	28%	43%	100%
Finance	30%	30%	40%	100%
Production	31%	30%	39%	100%

Communication systems can play an important role to the extent that they create a need for change, encourage change, and provide a means to implement change in organizations. The most difficult type of change in organizations is bottom-up change.

Communication definitely performs an innovative function in the ARC organization. Tables 6-27 and 6-28 indicate that for the top-level (as in the production function) communication do not perform much of an innovative function. Communication which encourages change and new ways of getting the work done, is rare. The middle echelons in the three Departments say that communication does not encourage change and newer methods of work, but the Production Department indicates an increase over the top-level. Perhaps the Production Department at the middle level is most innovative.

At the middle level, there are mainly professionals, who have dedication to the profession greater than to the particular organization.

subordinates than the other way round. The only exception to this finding is a study done by Habbe (1952), where status differences and communication flows can be surmounted with enough effort.

Hence, regardless of the organizational structure, they suggest change because it is needed. Also, the complex technology requires new and more efficient ways of task performance. Hence, the professionalism of the middle-level technical people and the job requirement for improved methods, may cause higher innovative communication.

The lower levels in the three Departments report a higher degree of innovation function for communication. The Production Department reports a lower degree of change-oriented messages communicated. The lower echelons are younger in age, and concerned with bottom-up change. The top echelons reports sending and receiving the fewest innovation messages.

The top levels are concerned with preservation of the system, as they are the gatekeepers. If they start changing, it may result in less power for themselves and weakening of their authority and influence. So they are least innovative. But as one moves down to middle echelons, there seems to be a slight increase in the innovation function performed by communication. Most innovations messages seem to emerge from the lower ranks toward the middle echelons, in the three Departments.

It appears that sending and receiving of new ideas is reciprocal. Those who send more new ideas, also receive new ideas. This is true all over the organization. But the Production Department seems to indicate greater difference in the innovation message behavior of top, middle, and lower echelons. This can be attributed to the nature of the technology used by the Production Department which deals with new situations, and requires individual solutions to problems. Hence, all

levels work together in finding solutions. Professionals are mostly self-motivated individuals, and hence the job itself may not be so important, but the challenge that the job provides is technologically complex and uncertain, and results in greater communication (in terms of receiving and sending) of new ideas.

CHAPTER VII

SUMMARY, CONCLUSIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

The present chapter contains (1) synthesis of the main aspects that have been discussed in preceding chapters, (2) the conclusions to which the foregoing analysis has led, (3) and suggestions for research ahead that have become apparent in the present paper.

Summary

Technology in organizations is considered here as the defining characteristics of the organization. In the long run perhaps this perspective holds that technology is considered one of the available and more useful basis for comparing organizations, like several others which view organizations as decision-making systems, control systems, or cooperative systems.

An examination of previous research on organizational communication shows there is a general consensus that communication is a central phenomena in organizations. Communication serves various functions in organizations. Still there is a little explicit discussion or empirical research on the structure and process of communication, in relation to other organizational characteristics. The technology level that an organization employs is the least explored area. There are no studies

available which relate technology to communication behavior in organization.

It is postulated that the organization is a system for getting the work done, and for applying techniques to the problem of altering raw materials--people, symbols, or things,--and that influences the basic work tool of communication. Technology is defined as those "actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make changes in that object. The object, or 'raw' material, may be a living being, human or otherwise, a symbol or an inanimate object."

Communication here refers to the transmission of idea from a source to a receiver with the intention of influencing his behavior.

An organization employs technology which is simple or complex, less mechanized or highly mechanized, depending on the task that has to be done. Within an organization, some units are technologically more homogeneous than others. The homogeneity or heterogeneity of technology will influence communication behavior. The more alike groups probably show more similar communication behaviors.

Within top, middle, and lower echelons of management, communication behaviors will be more similar within each level, than between levels.

The organization studied is called the ARC organization, which is located in North India. The organization deals in heavy steels, doing no commercial production, and only taking orders. The organization has four main Departments: Production, Commercial, Administration, and Finance.

The data were collected by observations, interviews, and questionnaires. The total sample consisted of 250 respondents who were at various hierarchical positions in the four Departments. The data were analyzed and tabulated, and results were found by the method of relative percentage frequency. As this was an exploratory study, the purpose was to get more information about communication behavior and environment. The methodology was simple, compared to the more sophisticated methodology of an hypothesis-testing exercise.

Finally, the study was done in one organization only, so the generalizability of the results is restricted to the ARC organization. It is a specific case study, hence, the results are limited in their application.

Conclusions

The primary conclusion to be drawn is that technology may be related to communication, but not as a magical package. The present study was a study of only one organization, hence, the results are restricted. Technology might possibly effect communication system, as Woodward has found, but it would be desirable to test the notion over several units of analysis, each of which is technologically-homogeneous.

It can be concluded from the analysis of the data that communication is a basic work tool that all Departments employ. It is as essential to the Production Department as it is to the Commercial, Administration, and Finance Departments.

The main conclusion from the results on mode of communication is that both oral and the written form are equally important to units

varying in technological complexity.

The study shows when there is contact between individuals of two different statuses, communication from the superior to subordinate generally takes place more easily than communication from the subordinate to the superior. This was true in all Departments. This means that the volume of lateral communication is very high. At the same time, a related conclusion is that there is a very substantial increase in the proportion of time spent in interaction that is devoted to peers, as we move downward in the rank system. Lower status individuals' communication is mostly with peers. This trend is due to the level of mechanization or level of technology. As the level of technology grows more complex and mechanized, the need for task-related communication from lower to higher levels decreases. Units employing less complex technologies do not indicate such tendency.

A principle of reciprocity among initiation and receivers of messages was found. All over the organization, the top level initiated most messages, but received the least number of messages from all levels. At the middle level, the initiation and reception rates were parallel. At the lower level, it was found that the fewest number of messages were initiated, but the messages received were the most in numbers. As one moves downward in the rank system, the communication from higher to lower levels increases, whereas the rate of upward-directed communication decreases.

Despite the prevalence of vertical communication, it appears that horizontal communication is essential to the proper functioning of the vertical system. Communication circuits were maintained among

groups of equivalent status. It cannot be too strongly emphasized that horizontal relations among peers in management constitute a dimension of organization behavior long neglected and probably as important as authority relations.

It was found that formal and informal systems tend to be jointly effective or ineffective at the top level in all Departments, regardless of differences in the level of technology. At the middle level, the first three Departments show jointly effectiveness of the two systems, but the Production Department's grapevine or informal system thrives in the absence of an effective formal system of communication. The lower level shows that informal is more effective because the formal systems are highly ineffective.

Further Research Suggestions

Traditionally, the organizational structure has been treated prescriptively, often with the implicit notion that effectiveness is enhanced by organizing in some special way. This was Weber's (1964) hypothesis regarding ideal-type bureaucracy, Taylor's (1937) hypothesis regarding scientific management, the hypotheses of 1930's and 1940's regarding the principles of classical management and public administration (Fayol, 1948, Gullick and Urwick, 1937), and more recently the hypothesis of human-relations theorists (Likert, 1961). There seems to be a need for a new perspective on structure. Structure needs to be studied as a dependent variable, where it is not manipulable at will but depends upon prior causal factors, such as the organization's environment (Thompson, 1967, Lawrence and Lorsch, 1967) and its

technology. The need for studying technology as an independent variable stems from the recognition that the work processes of an organization provide the foundation upon which social structure is built (Perrow, 1967). That is, technology is likely to determine whether structure is formalized or non-formalized, whether it has a diverse or relatively simple division of labor, and so together, the technological foundation and substructural social arrangements influence the organization.

Technology is not in itself a variable, but rather only a very broad concept that must become more specific to be useful in research and theory. Woodward (1964) specified the complexity of the system of production and the predictability of operations. Perrow (1957) suggested a similar dimension which orders the basic task of organizations from routine to non-routine, and orders the materials transformed by the organization's throughput in terms of its uniformity and analyzability. Hage and Aiken (1968) defined technology as routineness, measured at the individual level. Hickson et al (1969) measured technology as a composite dimension called workflow integration. It appears most of the conceptualizations of technology used in empirical technology structure research have been fairly closely gathered around the idea of predictability of operations. There is a need for finding a general variable of technology, as at present the concept subsumes many different ideas. Also important here is the idea that the dimension of technology needs to be a general dimension that can be used not only

in industry* (where the unit of analysis is an individual who works on machines and materials), but also in people-processing organizations (where the unit of analysis is an individual who works with clients, patients, etc).

Closely related to the need for a general dimension of technology is the need for comparative analysis of organizations. Comparative studies of organizations can be done on the basis of similar technologies or similar functions that the organizations have. Perrow (1967) and Pugh and his team (1970) argue that it is useless to compare organizations on the basis of functions, as function is not as determining as technology. It is the nature of throughput, in terms of what is actually done to the raw materials entering the organizations, that is the primary variable, rather than the function performed by the organization.

This creates an acute need for looking at organizations as a total system within which technology is studied.

Perhaps the most serious drawback in the application of existing conceptualizations of technology in organizational analysis, has been the concern for nominal subparts of organizations. Most common is a focus on various occupational groupings. In professional organizations such as schools, for example, functions are basically of three types--

*Industry here means mainly production systems and activities related to output. People-processing organizations are rehabilitation centers, mental hospitals, family agencies, schools, etc., where the material is a patient, a client, or a child. Perrow (1969) mentioned that it is really wasteful to test the effect of a parameter variable such as size, age, geographical dispersion, or national culture, unless we control on technology.

administration, professional staff (teachers), and maintenance and the present way of studying technology is useful. But in an organization like a hospital,* however, distinctions of this sort may be misleading.** Even treating such a seemingly homogeneous category as engineers as an organizational subdivision may lead one to overlook the fact that the engineers are employed not only in the production department, but also in finance, maintenance, sales, and purchase, and other departments, each of which involves such distinct roles as administrator, supervisors, foremen, etc.

Organizations need to be studied as complex, adaptive systems. Some of the variables which can be studied are: (1) the raw materials constituting the input of the organization, (2) the technology, which encompasses the throughput process of organization, or, in other words, that which is done to the raw materials, (3) the task structure, (4) the social structure of the organization, and (5) its goals. This, in essence, amounts to the suggestion that there is a need for studying organizations as open systems.*** Knowledge of the input into an

*For example, in a hospital there is an X-ray department, which consists of radiologists, technicians, clerks, and typists. Treating each of these as a separate unit (i.e., as occupational categories) ignores potentially more important aspects of this department as a system in its own right.

**A homogeneous group like nurses in an organization perform various tasks like director, supervisors, clerks, etc., all are nurses but work they are performing is of various types.

***Pugh et al (1968) do not use a systems framework in their study beyond saying that one must consider the context within which the organization operates. Perrow (1967) does not make explicit mention of a systems approach and yet his model is a reinforcement of the utility of the systems approach.

organization and the processings of that input is essential if one's to understand the task structure, social structure, and the goals of the organization.* To the extent that the input is highly diverse, material becomes a significant variable. The nature of the input affects the control and coordination subsystems of the organization. The organization of resources into particular patterns is in turn a function of existing "blueprints," codes, traditions, and experiences. These are used by individuals to order the resources available to perform a given task. A useful way of looking at this issue is that activity determines structure, or that organizations are complex, adaptive systems.

There is a need for research in the area of control and technology as Woodward (1969) has attempted. She suggests that it is an essential way to study the causal link between technological and organizational behavior by exploring the nature of managerial control.

*Managers who see themselves faced with a change in the nature of their raw materials, or in the processing of these materials, are able to predict, within reasonable limits, changes expected in the nature of the structures and goals of their organizations.

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